Focus on Future

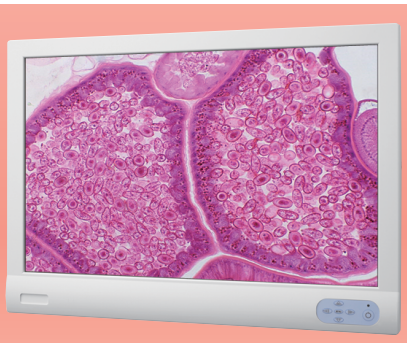
CAMERA CATALOG
ALL MODELS

TOSHIBA TELI CORPORATION

FINE Products & FINE Services

Teli's HD cameras and Full HD cameras for medical, microscope and inspection applications

- Allows high-speed Full HD video output and HD video output at 60 frames per second.
- High resolution CMOS sensor
- A variety of color representations at high contrasts



You can get images just by directly connecting the cameras to the monitor via the DVI-D connector.

Especially designed for use of microscopes

Full HD Camera

CSDW2M60CM28

1080p & 1080i

Compact, lightweight, and high resolution

HD Camera

CSDS60CM3

720p

Flexible Image Sensor

IMAGE SENSING EQUIPMENT

Toshiba Teli provides optimal solutions by flexibly meeting customers' needs for a wide range of image sensing equipment.

Flexible Sensor	A variety of optical sizes, pixel counts, and readout modes
Flexible Intelligence	Built-in function to perform a variety of intelligent image processing
Flexible Mechanic	Compatible with a variety of shapes and camera heads
Flexible Interface	Compatible with a variety of interfaces; affinity with peripheral equipment
Flexible Control	A variety of controls and easy-to-understand GUI

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Compatibility with optional parts and EMC conditions

The customer is responsible for confirming final EMC compatibility for all systems and equipment when used with parts not specified by Toshiba Teli.

Camera Model Name System

Example：Clever Dragon Series　CSC12M25CMP19

Camera model number
（TELI original）

CS	C	12M	25	C	M	P19
Interface	Pixel number	Frame rate	B&W/color	Sensor type	Sensor size	

Interface	Pixel number	Frame rate	B&W/color	Sensor type	Sensor size
IEEE1394：F	VGA　：V	90fps：90	Black&White：B	CCD　：C	1/3inch　：3
Camera Link：C	XGA　：X	36fps：36	Color　：C	CMOS　：M	1/2inch　：2
Gigabic Ethernet：G	SXGA　：S	7 fps：7		Line Sensor：L	1/1.8inch：18
DVI-D　：D	UXGA　：U			Three Layer：3L	1/2.3inch：23
	12M pixel：12M				1.9inch　：P19
					P=1inch or More

For products launched in and after October 2006, the model name system has changed.

FireDragon series

IEEE1394.b Interface

IEEE 1394.b | Progressive | RoHS

Dragon Series come to the 2nd generation——

Resolution (Mega pixel)	VGA (0.3M)	XGA (0.8M)	SXGA (1.3M)	UXGA (2M)
Frame Rate	90fps	36fps	20fps	15fps
B/W	CSFV90BC3-B	CSFX36BC3-B	CSFS20BC2-B	CSFU15BC18-B
Color	CSFV90CC3-B	CSFX36CC3-B	CSFS20CC2-B	CSFU15CC18-B

1394 TRADE ASSOCIATION

Overview

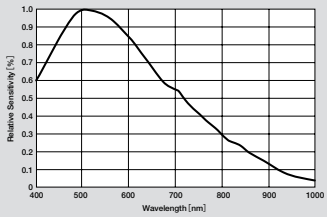
The FireDragon Series cameras are available in B/W and color models with resolutions ranging from VGA to UXGA quality. This series also offers the advantage of an IEEE1394.b interface and quick delivery.

Specifications B/W models

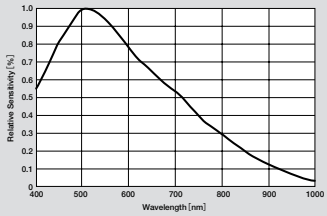
Item \ Model	CSFV90BC3-B	CSFX36BC3-B	CSFS20BC2-B	CSFU15BC18-B
Image sensor	All-pixel-data-readout interline transfer CCD			
Effective pixels	659 (H) ×494 (V)	1034 (H) ×779 (V)	1392 (H) ×1040 (V)	1628 (H) ×1236 (V)
Scanning area (H) × (V)	4.88mm×3.66mm (1/3 type)	4.81mm×3.62mm (1/3 type)	6.47mm×4.84mm (1/2 type)	7.16mm×5.44mm (1/1.8 type)
Cell size	7.4μm×7.4μm	4.65μm×4.65μm	4.65μm×4.65μm	4.40μm×4.40μm
Scan system	Progressive			
Sync system	Internal			
Aspect ratio	4 : 3			
Internal sync signal	36.0000MHz			
Sensitivity	Standard:600lx, F5.6 Min.:2.9lx, F1.4	Standard:800lx, F5.6 Min.:3.9lx, F1.4	Standard:500lx, F5.6 Min.:2.4lx, F1.4	Standard:400lx, F8 Min.:1.01lx, F1.4
	(Gain Maximum, all-pixel-data, video level 50%)			
Gain	0 to +18dB (91steps)			
Gamma	0.45 to 1.00			
Interface	Conforms to IEEE std 1394b-2002 (Transfer rate:800Mbps) Bilingual			
Video output	640×480 90fps (Max.)	1024×768 36fps (Max.)	1280×960 20fps (Max.)	1600×1200 15fps (Max.)
	(changed by scalable setting at FORMAT7 and MODE0.)			
Protocol	IIDC1394-based Digital Camera Specification ver.1.32 conformity			
Trigger signal	- External trigger input: Input level Low: 0 to 0.5V / High: 2.0 to 24.0V - Polarity : Positive / Negative bipolar - Pulse width : 2μs (Minimum) - Input impedance : High impedance - Software trigger: Trigger by command control is possible via the IEEE1394 interface			
Electronic shutter	PRESET mode: OFF, 1/100s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, 1/20000s (set up in the Value field of CSR register)			
Power	DC 8 to 30V (ripple 100 mV p-p or less) Power is supplied from IEEE1394 connector.			
Power consumption	2.6W (Max.)			
Lens mount	C-mount			
Dimensions	44mm (W) × 29mm (H) × 44mm (D) *Not including protrusion			
Weight	80g			
Regulations	CE, FCC			

Spectral Responce

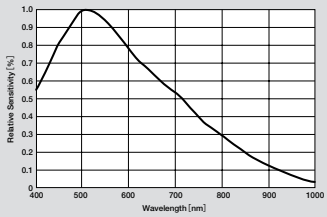
CSFV90BC3-B



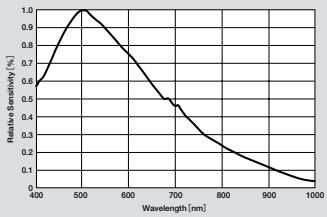
CSFX36BC3-B



CSFS20BC2-B



CSFU15BC18-B



Features

- **High frame rate**
- **All pixel readout**
- **Full-frame shutter**
- **Square grid array CCD**
- **Internal color process (color camera)**

Features RAW output (8/10-bit selectable) and RGB (24-bit), YUV4:2:2 (16-bit equivalent), and YUV4:1:1 (12-bit equivalent) output modes.

- **IEEE 1394.b interface**

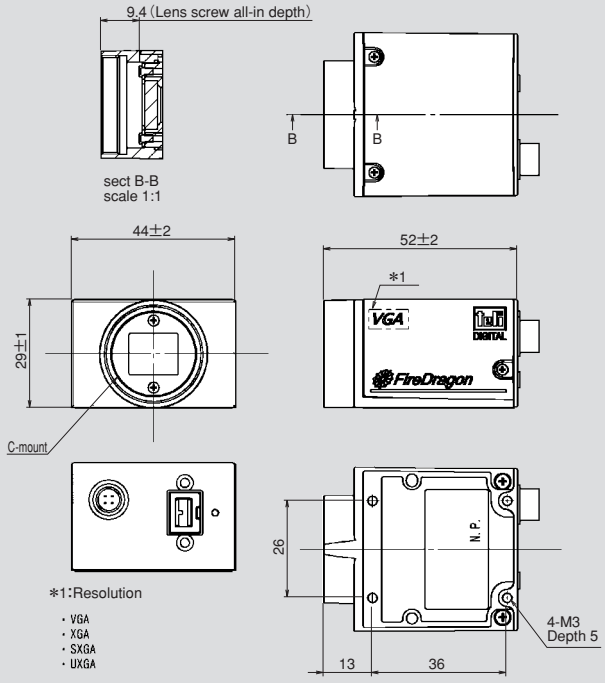
Video output and camera control use the IEEE1394.b high-speed serial interface standard with data transfers at 800 Mbps. Also compatible with IEEE1394.a devices. (Auto-detect)

- **IIDC1394-based Digital Camera Specification ver.1.32 conformity**
- **Random Trigger Shutter**
- **Scalable**
- **Ultra-compact, light weight**
- **RoHS compatible**

Specifications Color models

Item \ Model	CSFV90CC3-B	CSFX36CC3-B	CSFS20CC2-B	CSFU15CC18-B
Image sensor	All-pixel-data-readout interline transfer CCD			
Effective pixels	659 (H) ×494 (V)	1034 (H) ×779 (V)	1392 (H) ×1040 (V)	1628 (H) ×1236 (V)
Scanning area (H) × (V)	4.88mm×3.66mm (1/3 type)	4.81mm×3.62mm (1/3 type)	6.47mm×4.84mm (1/2 type)	7.16mm×5.44mm (1/1.8 type)
Cell size	7.4μm×7.4μm	4.65μm×4.65μm	4.65μm×4.65μm	4.40μm×4.40μm
Scan system	Progressive			
Sync system	Internal			
Aspect ratio	4 : 3			
Sensitivity	Standard:1700lx, F5.6 5000K	Standard:2400lx, F5.6 5000K	Standard:1400lx, F5.6 5000K	Standard:1000lx, F8 5000K
	Min.:5.5lx, F1.4	Min.:7.8lx, F1.4	Min.:4.6lx, F1.4	Min.:1.8lx, F1.4
	(Gain Maximum, all-pixel-data, video level 50%, Gamma ON)			
Gain	-6 to +18dB (91steps)			
White balance	Manual / One Push Auto / Full Auto 2500K to 6500K			
Interface	Conforms to IEEE std 1394b-2000 (Transfer rate:800Mbps) Bilingual			
Video output	640×480 90fps (Max.)	1024×768 36fps (Max.)	1280×960 20fps (Max.)	1600×1200 15fps (Max.)
	(changed by scalable setting at FORMAT7 and MODE0.)			
Protocol	IIDC1394-based Digital Camera Specification ver.1.32 conformity			
Trigger signal	- External trigger input: Input level Low: 0 to 0.5 V / High: 2.0 to 24.0 V - Polarity : Positive / Negative bipolar - Pulse width : 2μs (Minimum) - Input impedance : High impedance - Software trigger: Trigger by command control is possible via the IEEE1394 interface			
Electronic shutter	PRESET mode: OFF, 1/100s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, 1/20000s (set up in the Value field of CSR register)			
Gamma	0.45 to 1.00			
Power	DC 8 to 30V (ripple 100 mV p-p or less) Power is supplied from IEEE1394 connector.			
Power consumption	2.6W (Max.)			
Lens mount	C-mount			
Dimensions	44mm (W) × 29mm (H) × 44mm (D) *Not including protrusion			
Weight	80g			
Regulations	CE, FCC			

Dimensions



CleverDragon series

CameraLink Interface

CL Progressive RoHS

Dragon Series come to the 2nd generation

Resolution (Mega pixel)		VGA (0.3M)			XGA (0.7M)	SXGA (1.2M)	UXGA (2M)	
Image sensor		CCD						
Frame rate		90fps		125fps	30fps	20fps	15fps	30fps
B/W	PoCL	CSCLV90BC3	CSCV90BC3	CSCV125BC3	CSCX30BC3	CSCS20BC2	CSCU15BC18	CSCU30BC18
	non-PoCL	—	CSCV90BC3-01	—	CSCX30BC3-01	CSCS20BC2-01	CSCU15BC18-01	CSCU30BC18-01
Color	PoCL	—	—	CSCV125CC3	—	—	CSCU30CC18	—
	non-PoCL			—			CSCU30CC18-01	

Resolution (Mega pixel)		QSXGA (5M)		12M
Image sensor		CCD		CMOS
Frame rate		9fps	15fps	25fps
B/W	PoCL	—	CSCQS15BC23-01	—
	non-PoCL		CSCQS15BC23	CSC12M25BMP19-01B
Color	PoCL	CSCQS9CC23-01	CSCQS15CC23-01	—
	non-PoCL	CSCQS9CC23	CSCQS15CC23	CSC12M25CMP19

New product

CSCLV90BC3

PoCL

CSCV90BC3

CAMERA Link

CSCQS15BC23

Overview

The CleverDragon series features Camera Link interface. A range of resolutions and B/W or color models are available, including ultra-compact and space-saving all-in-one chassis.

Features

- **All pixel readout**
- **Full frame shutter**
  All-pixel readout is possible even in Random Trigger Shutter mode with no degradation in vertical resolution.
- **Square grid array CCD**
- **Camera Link interface**
  Power over Camera Link compatible frame grabber board enables high-speed transfer of images and camera control by PC; only a single power supply cable is needed for the camera.
  (There is a non-PoCL model too. Please inquire for detailed interface specifications.)
- **Random Trigger Shutter**
  The Random Trigger Shutter starts exposure by synchronizing with external trigger signals, capturing high-speed moving objects in fixed positions and accurately processing images.
- **Programmable partial scan**
  Only necessary signals from all pixels (effective area) are output. Further high-speed processing is made possible by skipping areas other than the image output area designated.
- **Restart and reset**
  Images can be shot and captured at given times by means of external VD signal input.
- **Particsl scan**
  Further hight-speed processing is enabled by skipping areas other than the user-designated image output area.
- **Ultra-compact/space-saving and lightweight**
  Built to be compact and save space, as well as to resist vibration and shock.
- **RoHS compliant**

CleverDragon Series

CSC12M25CMP19 [color]
CSC12M25BMP19-01B [B/W]

Ultra-High precision [12M] High frame rate [25fps] B/W camera

12M pixel | CL | Progressive | RoHS

Overview

Incorporating a 1.9type, 12.58 megapixel CMOS progressive scan sensor developed by Toshiba Teli, this camera offers ultra-high resolution and high frame rates. A color camera model now joins the product line composed of monochrome cameras.

Feature

- **High-speed output of ultra-high-resolution images**
  12.58 megapixel images are output at a speed of 25 fps in Raw output mode.
- **WOI (Window of Interest)**
  Variable frame rates are supported, allowing even higher frame rates by reading pixels only in areas specified using horizontal and vertical addresses. (See next page.)
- **Global shutter**
  Like the CCD image sensor models, the camera incorporates a digital global shutter to achieve sharp, less blur images, even for fast-moving subjects.
- **Random trigger shutter mode**
  Allows control of imaging and output timing with external trigger input.
- **Camera link interface**
  The dual MDR connector supporting Camera Link Medium Configuration outputs the entire 12.58 mega pixels in a speed as fast as 25fps. As it also supports Camera Link Base Configuration to output the entire 12.58 mega pixels in a speed as high as 12.5fps by a single one-sided MDR connector, it can support a wide variety of image processors.
- **TFL-II lens mount**
  The camera features Toshiba Teli's own TFL-II mount to take full advantage of the large, high-resolution sensor. The optional FTAR-2 mount adapter allows use of F-mount lenses.

Specifications

item \ model	CSC12M25BMP19-01B	CSC12M25CMP19
Image sensor	CMOS Monochrome image sensor	CMOS image sensor
Effective pixels	4096 (H) ×3072 (V)	
Scanning area (H) × (V) mm	24.6mm (H) ×18.5mm (V) (1.9 type)	
Cell size (Square pixel)	6μm (H) ×6μm (V)	
Color Filter	—	R, G, B primary color mosaic filters
Scan system	Progressive	
Sync system	Internal	
Aspect ratio	4 : 3	
Interface	Camera Link compatible (non-PoCL)	
Video output (H) × (V) [fps]	Data 10/8bit switching All-pixel-data : 4096×3072 [approx. 25fps] Binning mode : 2048×1536 [approx. 41.8fps] Sub-sampling (8×8) : 512×384 [approx. 200fps] *Medium configuration, Shutter OFF mode	RAW 8bit / RAW 10 bit switching All-pixel-data : 4096×3072 [approx. 25fps] *Medium configuration,10bit, Shutter OFF mode
Sensitivity	Standard : 2000 lx, F5.6 3000 K Min : 30 lx F2.8 (Gain Maximum, video level 50%)	Standard : 3000lx, F4 5000K Min : 125lx, F2.8 (Gain Maximum, all-pixel-data, video level 50%)
Internal sync signal	All-pixel-data : 75kHz (H) /25Hz (V) Binning mode : 54kHz (H) /43.5Hz (V) Sub-sampling : 75kHz (H) /50 to 200Hz (V) *Medium configuration, Shutter OFF mode	All-pixel-data : 75kHz (H) /25Hz (V) *Medium configuration, Shutter OFF mode WOI : It depends on the window setting.
Gain	0 to +18dB (180steps)	
Gamma	OFF (γ=1.0)	
White balance	—	Manul / One Push Auto
Trigger signal	TTL	
Electronic shutter	Shutte speed 1/20,000 to 2 sec. ON/OFF switching	
Power	DC12V±10%	
Power consumption	Approx. 5.4W	
Lens mount	TFL-II mount (Original mount) F-mount lens can be used with mount conversion adapter FTAR-2 (option)	
Dimensions	75mm (W) ×75mm (H) ×69.5mm (D) *Not including protrusion	
Weight	Approx. 450g	
Regulations	CE, FCC	

CleverDragon series

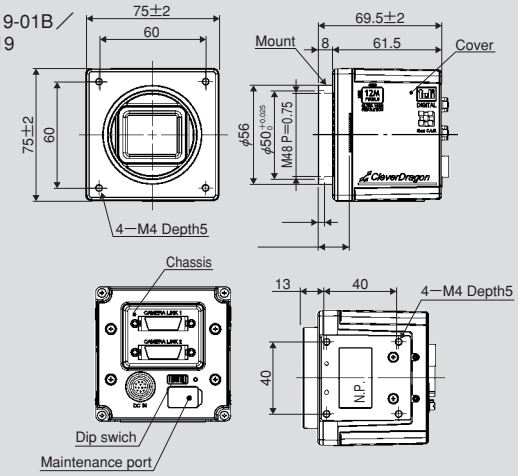
CameraLink Interface

CSC12M25CMP19 [color]
CSC12M25BMP19-01B [B/W]

Ultra-High precision [12M] High frame rate [25fps] B/W camera

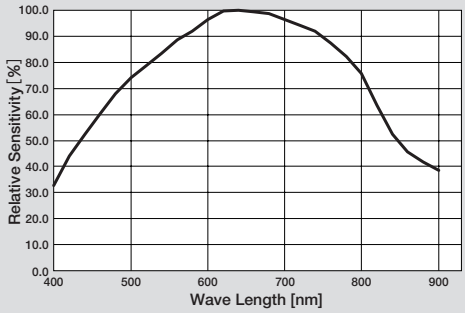
Dimensions

CSC12M25BMP19-01B／
CSC12M25CMP19



Spectral Responce

CSC12M25BMP19-01B



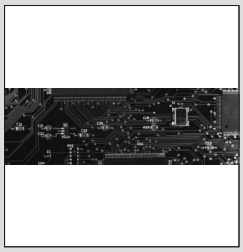
CMOS Camera Feature

Supports High-speed Window of Interest (WOI).

The CMOS configuration enables scanning of user-specified subregions within the exposed area for faster scans. Partial scanning with conventional CCD cameras allows partial scanning only along the vertical axis; in contrast, the WOI function enables simultaneous scanning of multiple selected areas.

● All pixel data readout

● CCD camera



CCD image sensor allows one vertically oriented subregion to be scanned to accelerate the frame rate, but horizontal subregion can not be changed.

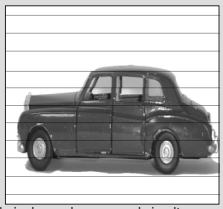
● CMOS camera

CMOS image sensor allows both vertical and horizontal subregions in WOI function with faster frame rate. Multiple subregions are selectable by scanning only necessary region.

Handles moving subjects

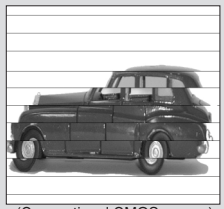
The global shutter (synchronous shutter) enables all pixels to be exposed at the same time, as with conventional CCDs, making it ideal for machine vision applications involving moving subjects.

Global shutter image



(All pixels can be exposed simultaneously)

Rolling shutter/focal-plane accumulation



(Conventional CMOS sensor)

Model	Max No. WoI	Min. Size WoI
CSC12M25BMP19-01B CSC12M25CMP19	28	16 (H)×2 (V)
CSB1100CL-10 CSB4000CL-10A	16	40 (H)×1 (V)
CSB4000F-20		100 (H)×100 (V)

● Crossover : Yes

Provides wide dynamic range

Multi-slope function
Wide dynamic range is achieved by compressing highlight/shadow contrast using the CMOS sensor itself.

Linear output image

(Optimized for highlights)

(Optimized for shadow)

Wide dynamic range image

CleverDragon series

CSCLV90BC3

20 mm cube ultra-compact B/W camera

0.33M pixel | PoCL lite | Progressive | RoHS

Overview

The CSCLV90BC3 Series of products are integral monochrome cameras incorporating a VGA-compatible interline CCD that reads out all pixels.
Using a drive frequency three times higher than that found in conventional CCD cameras for high-speed performance, the compact, lightweight cameras are ideal for incorporation into other devices.

Features

●Ultra-compact and light weight
The camera units are ultra-compact, measuring 20 mm x 20 mm (Not including protrusion) and offer outstanding vibration and impact resistance.

●3x read rates
Images are read out three times faster than with conventional cameras.

●All pixel readout
All pixel readout in approximately 1/90 second.

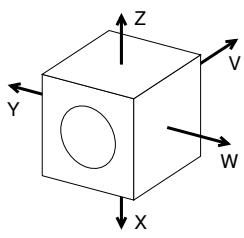
●Features PoCL-Lite interface
Allows use of a frame-grabber board powered over the camera link for high-speed transfers of images to and camera control from a PC. A single cable provides both camera power and signal connections.

●RoHS compliant

Specifications

item \ model	CSCLV90BC3
Image sensor	All-pixel-data-readout interline transfer CCD
Effective pixels	659 (H) ×494 (V)
Scanning area	4.88mm (H) ×3.66mm (V) (1/3 type)
Cell size (Square pixel)	7.4μm×7.4μm
Scan system	Progressive
Sync	Internal
Aspect ratio	4 : 3
Interface	Camera Link version 1.2 compatible
Video output (H) × (V) [fps]	Data : 10 / 8 bit switching All-pixel-data : 648×494 [Approx. 90fps] Partial scan : 648×120 to 494 [Approx. 94.8 to 290.3fps] Min : 120 line, Step : 1 line
Sensitivity	Standard : 600lx, F5.6 (Gain : Fix) Min : 6lx, F1.4 (Gain : 10dB, video level 50%)
Internal sync	36.000MHz (1CLK) ±100ppm Sync frequency : 46.153kHz (H) (1H=780CLK) / 92.4Hz (V) (maximum speed on normal shutter mode)
Gain	0 to Approx. +12dB [1step=Approx. 0.1dB]
Gamma	OFF (γ=1.0 fixed)
Trigger signal	TRIG/VD Camera Link interface input : CC1 Polarity Positive/Negative switching, pulse width Minimum : 2μs
Electronic shutter	Shutter speed 8/1 to 1/20,000 [sec]
Power	DC12V±10% (ripple 50mVp-p or less)
Power consumption	Approx. 1.3W
Lens mount	M10.5 P0.5 female
Dimensions	20mm (W) ×20mm (H) ×20mm (D) ＊Not including protrusion
Weight	Approx. 20g
Regulations	CE, FCC

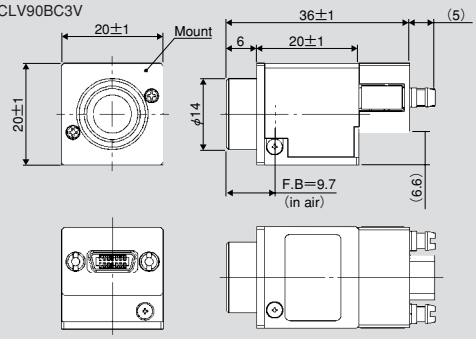
Cable outlet variation:



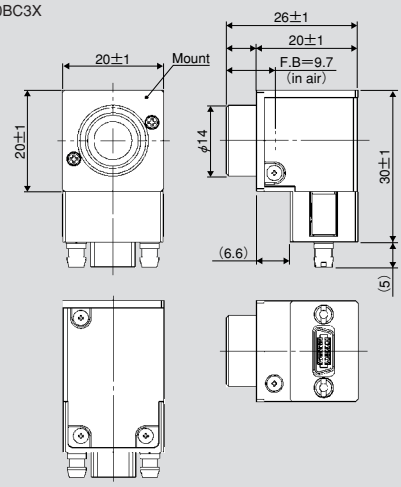
CSCLV90BC3V V : Rear [Default]
CSCLV90BC3W W : Left
CSCLV90BC3X X : Bottom
CSCLV90BC3Y Y : light
CSCLV90BC3Z Z : Top

Dimensions

CSCLV90BC3V



CSCLV90BC3X



CleverDragon Series

CSCV125CC3 [Color]
CSCV125BC3 [B/W]

VGA 4x Speed Camera

0.33M pixel | PoCL | Progressive | RoHS

NEW

Overview

These cameras use the VGA-format-compatible all-pixel-readout interline CCD. Color cameras are provided in addition to B/W ones. These cameras have achieved high speed by quadrupling the drive frequency of conventional CCD cameras.
These cameras are suitable for high speed high resolution image processing. Also, the camera body is compact and light, being most suitable for being incorporated into other devices.

Features

●4x speed readout
These cameras read out images four times faster than conventional CCD cameras.

●All pixel readout
These cameras read out all pixels in about 1/125 sec, using the all pixel independent readout mode. They provide the full-frame shutter that can read all pixels even when the shutter is operating.

●CameraLink interface (Power over CameraLink)
By using the CameraLink compatible frame grabber board that can provide power supply, it is made possible to perform high-speed transfer of images to your PC and to perform various camera controls from your PC, and also to provide power supply to the camera through a single power supply cable.

●Ultra-compact and light weight
The camera body is made smaller, providing an excellent space saving as well as an excellent vibration resistance and shock resistance.

●RoHS compliant

Specifications

item \ model	CSCV125BC3	CSCV125CC3
Image sensor	All-pixel-data-readout interline transfer CCD	
Effective pixels	659 (H) ×494 (V)	
Scanning area	4.88mm (H) ×3.66mm (V) (1/3 type)	
Cell size (Square pixel)	7.4μm×7.4μm	
Calor filter	—	RGB primary color mosaic on-chip color filter
Scan system	Progressive	
Sync system	Internal	
Aspect ratio	4 : 3	
Interface	Camera Link version 1.2 compatible	
Video output (H) × (V) [fps]	Data : 10 / 8 bit switching [Initial setting : 8bit] All-pixel-data : 648×494 [Approx. 126.2fps] Partial scan : 648×120 to 480 [Approx. 129.5 to 395.8fps] Min : 120 lines, Step : 1 line	Data : RGB 24bit / RAW 10bit / RAW 8bit switching [Initial setting : RGB 24bit] All-pixel-data : 640×480 [Approx. 127.7fps] Partial scan : 640×120 to 480 [Approx. 127.7 to 378.6fps] Min : 120 lines, Step : 2 lines
Sensitivity	Standard : 850lx, F5.6 (Gain : Fix) Min : 8lx, F1.4 (Gain : 10dB, video level 50%)	Standard : 2400lx, F5.6 (Gain : Fix) Min : 20lx, F1.4 (Gain : 18dB, video level 50%)
Internal sync signal	49.090902MHz (1CLK) ±100ppm Sync frequency : 62.937kHz (H) (1H=780CLK) / 126.26Hz (V) (maximum speed on normal shutter mode)	49.090902MHz (1CLK) ±100ppm Sync frequency : 62.937kHz (H) (1H=780CLK) / 127.66Hz (V) (maximum speed on normal shutter mode)
Gain	-6 to Approx. +18dB [1step=Approx. 0.1dB]	
Gamma	OFF (γ =1.0 fixed)	ON / OFF [Initial setting: OFF] *Disabled (OFF) at the time of raw data output (8/10bit)
White balance	—	Manul / One Push Auto *Disabled (OFF) at the time of raw data output (8/10bit)
Trigger signal	Camera Link interface input : CC1 Polarity Positive/Negative Pulse width Minimum : 2μs	
Electronic shutter	Shutter speed 8/1 to 1/100,000 [sec]	
Power	DC12V ±10% (ripple 50mVp-p or less)	
Power consumption	Approx. 1.8W	
Lens mount	C-mount	
Dimensions	29mm (W) ×29mm (H) ×26.5mm (D) ＊Not including protrusion	
Weight	Approx. 40g	
Regulations	CE, FCC	

CleverDragon series

CameraLink Interface

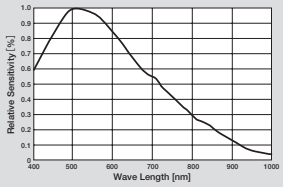
Specifications B/W models

Item \ Model	CSCV90BC3 CSCV90BC3-01*	CSCX30BC3 CSCX30BC3-01*	CSCS20BC2 CSCS20BC2-01*	CSCU15BC18 CSCU15BC18-01*	CSCU30BC18 CSCU30BC18-01*
Image sensor	All-pixel-data-readout interline transfer CCD				
Effective pixels	659 (H) ×494 (V)	1034 (H) ×779 (V)	1392 (H) ×1040 (V)	1628 (H) ×1236 (V)	
Scanning area (H) × (V) mm	4.88×3.66 (1/3 type)	4.81×3.62 (1/3 type)	6.47×4.84 (1/2 type)	7.16×5.44 (1/1.8 type)	
Cell size (Square pixel)	7.4μm×7.4μm	4.65μm×4.65μm	4.65μm×4.65μm	4.4μm×4.4μm	
Scan system	Progressive				
Sync system	Internal				
Aspect ratio	4 : 3				
Interface	Camera Link (PoCL/non-PoCL)				
Video output (H) × (V) [fps]	Data:10/8bit switching				Data:12/10/8bit switching
	All-pixel-data:648×494 [Approx. 92.4fps]	All-pixel-data:1024×768 [Approx. 29.99fps]	All-pixel-data:1360×1024 [Approx. 19.5fps]	All-pixel-data:1616×1200 [Approx. 15.0fps]	All-pixel-data:1628×1236 [Approx. 30fps]
Sensitivity	Standard:600lx, F5.6 Min:6lx, F1.4 (Gain:10dB, video level 50%)	Standard:400lx, F5.6 Min:4lx, F1.4 (Gain:10dB, video level 50%)	Standard:500lx, F5.6 Min:5lx, F1.4 (Gain:10dB, video level 50%)	Standard:200lx, F5.6 Min:2lx, F1.4 (Gain:10dB, video level 50%)	Standard:600lx, F5.6 3000K Min:6lx, F1.4 (Gain:Max, video level 50%)
Internal sync signal	36.000MHz (1CLK) ±100ppm Sync frequency:46.153kHz (H) (1H=780CLK) /92.4Hz (V) (maximum frequency on all pixel readout mode)	29.50MHz (1CLK) ±100ppm Sync frequency:23.22kHz (H) (1H=1270CLK) /29.99Hz (V) (maximum frequency on all pixel readout mode)	36.00MHz (1CLK) ±100ppm Sync frequency:20.11kHz (H) (1H=1790CLK) /19.49Hz (V) (maximum frequency on all pixel readout mode)	36.00MHz (1CLK) ±100ppm Sync frequency:18.75kHz (H) (1H=1920CLK) /15.48Hz (V) (maximum frequency on all pixel readout mode)	72.000MHz All-pixel-data Sync frequency:37.500kHz (H) /30.000Hz (V)
Gain	0 to Approx. +12dB (1step=Approx. 0.132dB)				0 to +12dB (150steps)
Gamma	OFF (γ=1.0 fixed)				
Trigger signal	TRIG/VD Camera Link interface input:CC1 Polarity Positive/Negative switching Pulse width Minimum:2μs				TRIG/VD Camera Link interface, I/O connector input:Polarity Positive/Negative switching Pulse width:more than 26.7μs
Electronic shutter	Shutter speed 8/1 to 1/20,000 [sec]		Shutter speed 2/1 to 1/20,000 [sec]		ON / OFF switching All-pixel-data shutter speed:1/30 to 1/65,934 [sec] (1250steps)
Power	DC12V±10% (ripple 50mVp-p or less)				
Power consumption	Approx. 1.6W	Approx. 1.3W	Approx. 1.8W		Approx. 4.5W
Lens mount	C-mount				
Dimensions	29mm (W) ×29mm (H) ×26.5mm (D) ＊Not including protrusion				54mm (W) ×43mm (H) ×59mm (D) ＊Including lens mount 8mm
Weight	Approx. 45g				Approx. 170g
Regulations	CE, FCC (PoCL only)	CE, FCC	CE, FCC (PoCL only)	CE, FCC	CE, FCC (PoCL only)

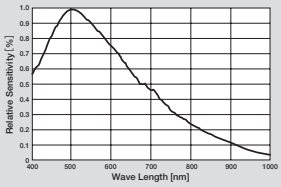
*Built to order

Spectral Responce

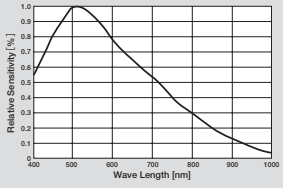
CSCV90BC3／CSCV125BC3



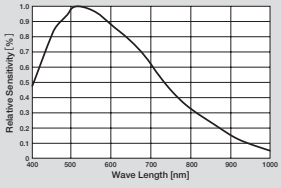
CSCU15BC18／CSCU30BC18



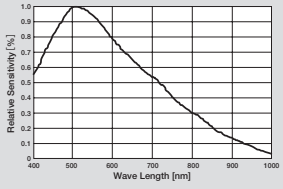
CSCX30BC3



CSCQS15BC23

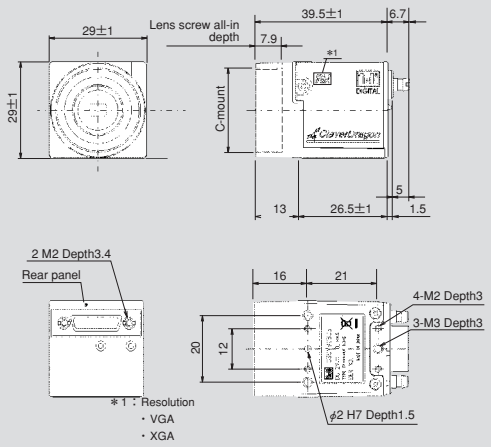


CSCS20BC2



Dimensions

CSCV90BC3／CSCX30BC3
／CSCV125BC3／CSCV125CC3



Specifications B/W models

Item \ Model	CSCQS15BC23 / CSCQS15BC23-01*
Image sensor	All-pixel-data-readout interline transfer CCD
Effective pixels	2456 (H) ×2058 (V)
Scanning area (H) × (V) mm	8.47×7.1 (2/3 type)
Cell size (Square pixel)	3.45μm×3.45μm
Scan system	Progressive
Sync system	Internal
Aspect ratio	6:5
Interface	Camera Link (PoCL/non-PoCL)
Video output (H) × (V) [fps]	Data:12/10/8bit switching All-pixel-data:2456×2058 [Approx. 15fps]
Sensitivity	Standard:400lx, F5.6 3000K Min:6.25lx, F1.4 (Gain:Max, video level 50%)
Internal sync signal	60.000MHz All-pixel-data Sync frequency:31.185kHz (H) /15.104Hz (V)
Gain	0 to +12dB (121steps)
Gamma	OFF (γ=1.0 fixed)
Trigger signal	TRIG/VD Camera Link interface, I/O connector input:Polarity Positive/Negative switching Pulse width:more than 30.1μs
Electronic shutter	ON / OFF switching Shutter speed 2/1 to 1/20,000 [sec]
Power	DC12V±10% (ripple 50mVp-p or less)
Power consumption	Approx. 4.0W
Lens mount	C-mount
Dimensions	54mm (W) ×43mm (H) ×59mm (D) *Including lens mount 8mm
Weight	Approx. 180g
Regulations	CE, FCC

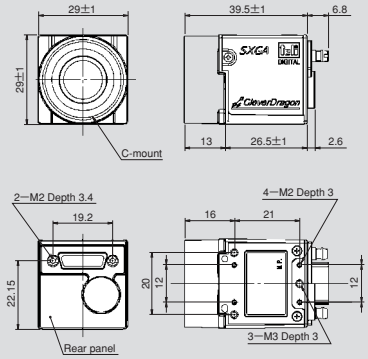
*Built to order

Specifications Color models

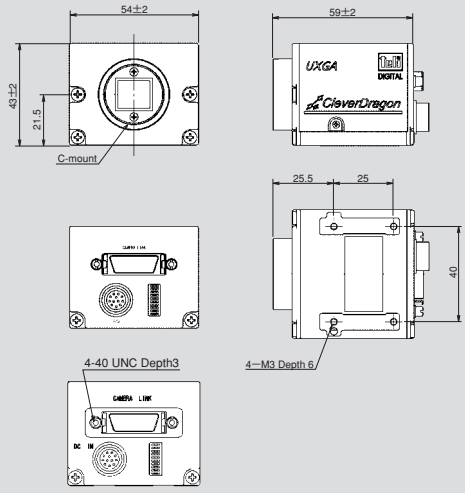
Item \ Model	CSCU30CC18 / CSCU30CC18-01*	CSCQS9CC23 / CSCQS9CC23-01*	CSCQS15CC23 / CSCQS15CC23-01*
Image sensor	All-pixel-data-readout interline transfer CCD		
Effective pixels	1628 (H) ×1236 (V)	2456 (H) ×2058 (V)	
Scanning area (H) × (V) mm	7.16×5.44 (1/1.8 type)	8.47×7.1 (2/3 type)	
Cell size (Square pixel)	4.4μm×4.4μm	3.45μm×3.45μm	
Scan system	Progressive		
Sync system	Internal		
Aspect ratio	4:3	6:5	
Interface	Camera Link (PoCL/non-PoCL)		
Video output (H) × (V) [fps]	Data RGB 24bit/RAW (12/10/8bit) switching		
	All-pixel-data:1628×1236 [approx. 30fps]	All-pixel-data:2448×2058 [approx. 9.3fps]	All-pixel-data:2448×2058 [approx. 15fps]
Sensitivity	Standard:2400lx, F8 5000K Min:35lx, F1.4 (Gain:Max, video level 50%)	Standard:2200lx, F8 5000K Min:9lx, F1.4 (Gain:Max, video level 50%)	Standard:1800lx, F8 5000K Min:14lx, F1.4 (Gain:Max, video level 50%)
Internal sync signal	72.000MHz All-pixel-data 37.500kHz (H) / 30.000Hz (V)	49.0909MHz All-pixel-data 19.21kHz (H) /9.30Hz (V)	80.000MHz All-pixel-data 31.185kHz (H) /15.09Hz (V)
Gain	0 to +6dB (76steps)	0 to +6dB (61steps)	
Gamma	ON / OFF switching (1.0 / 0.65 / USER)		
White balance	Manual / One Push Auto White Balance User Manual (R/B Gain) setting / Preset setting (6 data)		
Trigger signal	TRIG/VD Camera Link interface, I/O connector input:Polarity Positive/Negative switching Pulse width:more than 26.7μs	TRIG/VD Camera Link interface, I/O connector input: Polarity Positive/Negative switching Pulse width:more than 52.1μs	
Electronic shutter	ON / OFF switching All-pixel-data / Partial scan shutter speed:1/30 to 1/65,934 [sec] (1250steps)	ON / OFF switching Shutter speed 2/1 to 1/20,000 [sec]	
Power	DC12V±10% (ripple 50mVp-p or less)		
Power consumption	Approx. 4.5W	Approx. 4.6W	Approx. 4.8W
Lens mount	C-mount		
Dimensions	54mm (W) ×43mm (H) ×59mm (D)	54mm (W) ×43mm (H) ×69mm (D)	
Weight	Approx. 175g	Approx. 190g	
Regulations	CE, FCC (PoCL only)	CE, FCC (non-PoCL only)	

*Built to order

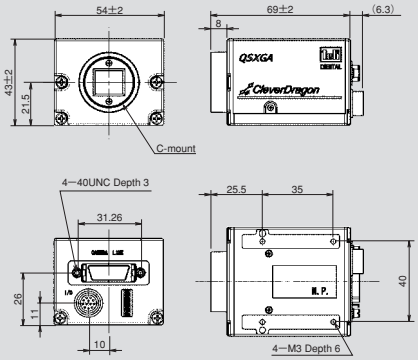
CSCS20BC2／CSCU15BC18



CSCU30BC18／CSCU30CC18／CSCQS15BC23



CSCQS9CC23／CSCQS15CC23



(Rear：CSCQS15BC23)

GiantDragon series

Gigabit Ethernet Interface

GigE Progressive RoHS

GiGE VISION™

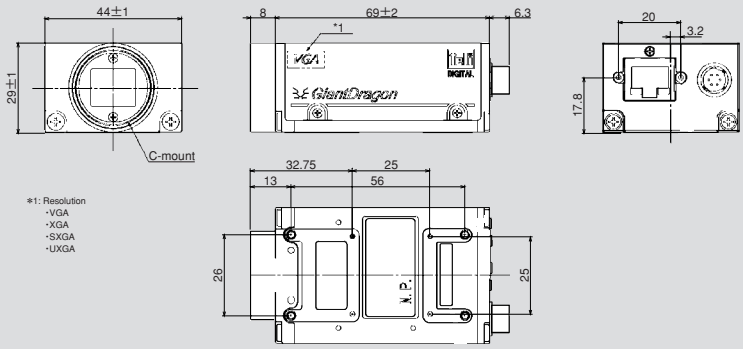
Features

- **High frame rate**
- **All pixel readout**
- **Full-frame shutter**
- **Square grid array CCD**
- **Gigabit Ethernet* interface**
  Performs video output and camera control via the Gigabit Ethernet standard IEEE802.3ab interface. Data transfer is at 1Gbps that can output uncompressed video data of high frame rate.
- **GigEVision Ver 1.0 conformity**
- **GenICam Ver 1.0 conformity**
- **Random trigger shutter**
- **Scalable**
  Selectable video output area. It can be higher frame rate by reducing vertical output area. And can be reduce occupied data rate of Gigabit Ethernet by reducing horizontal output area.
- **Compact and lightweight**
  Compact and lightweight, This camera can easy to integrate into industrial equipment.
- **RoHS compliant**

Overview

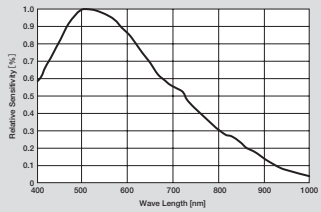
GiantDragon Series are available in B/W and color models with resolutions ranging from VGA to UXGA quality (9 models total). The band width allows the camera to transfer the image data at 1Gbps so this series also can achieve high frame with the advantage of GigE vision interface. And, it is high-speed and a camera series that is appropriate for the image data processing of a high resolution.

Dimensions



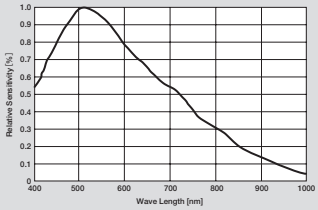
*1: Resolution
・VGA
・XGA
・SXGA
・UXGA

CSGV90BC3-B

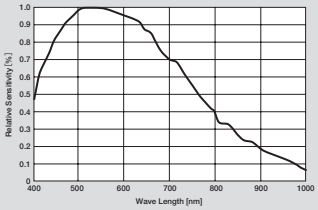


Spectral Response

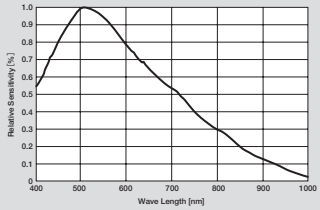
CSGX36BC3-B



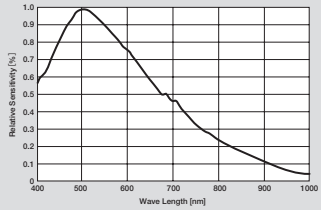
CSGS15BC23-B



CSGS20BC2-B



CSGU15BC18-B



* Ethernet is registered trademark of Xerox.

Resolution (Mega pixel)	VGA (0.3M)	XGA (0.8M)	SXGA (1.5M)		UXGA (2M)
Frame rate	90fps	36fps	15fps	20fps	15fps
Model	CSGV90BC3-B	CSGX36BC3-B	CSGS15BC23-B	CSGS20BC2-B	CSGU15BC18-B

B/W models

Item \ Model	CSGV90BC3-B	CSGX36BC3-B	CSGS15BC23-B	CSGS20BC2-B	CSGU15BC18-B
Image sensor	all-pixel-data-readout interline transfer CCD				
Effective pixels	659 (H) ×494 (V)	1034 (H) ×779 (V)	1392 (H) ×1040 (V)		1628 (H) ×1236 (V)
Scanning area	4.88 (H) mm×3.66 (V) mm (1/3type)	4.81 (H) mm×3.62 (V) mm (1/3type)	8.98 (H) mm×6.71 (V) mm (2/3type)	6.47 (H) mm×4.84 (V) mm (1/2type)	7.16 (H) mm×5.44 (V) mm (1/1.8type)
Cell size (Square pixel)	7.4 (H) μm×7.4 (V) μm	4.65 (H) μm×4.65 (V) μm	6.45 (H) μm×6.45 (V) μm	4.65 (H) μm×4.65 (V) μm	4.40 (H) μm × 4.40 (V) μm
Interface	Gigabit Ethernet IEEE802.3ab (1000 BASE-T) compatible				
Protocol	GigEVision Camera Interface Standard for Machine Vision Ver 1.0				
Scan system	Progressive				
Video format	GVSP_PIX_MONO8：MONO8bit／GVSP_PIX_MONO10：MONO10bit				
Frame rate	90fps (Max)	36fps (Max)	15fps (Max)	20fps (Max)	15fps (Max)
Binning mode	1/2 240 line 170fps (Max)	1/2 384 line 64 fps (Max)	1/2 512 line 32fps (Max)	1/2 480 line 34fps (Max)	1/4 300 line 46fps (Max)
Sync	Internal				
Internal sync	36.0000MHz±100ppm				
Aspect ratio	4：3				
Sensitivity	Standard:600lx, F5.6 1/90s Min:5lx, F1.4 (GAIN Maximum, video level 50%)	Standard:800lx, F5.6 1/36s Min:7lx, F1.4 (GAIN Maximum, video level 50%)	Standard:500lx, F5.6 1/20s Min:1.5lx, F1.4 (GAIN Maximum, video level 50%)	Standard:400lx, F8 1/15s Min:4lx, F1.4 (GAIN Maximum, video level 50%)	Standard:400lx, F8 1/15s Min:2lx, F1.4 (GAIN Maximum, video level 50%)
Gain	0 to +12dB (75steps)				
Gamma	OFF (γ=1.0 fixed)				
Trigger signal	Low：0 to 0.5V High：3.3 to 24.0V Polarity Positive/Negative switching (Initial setting：Negative) Pulse width Minimum：50μs				
Electronic shutter	PRESET mode：1/100s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, 1/20000s Absolute value mode：1/20000s to 2s				
Power	DC12V±10% (ripple 50mVp-p or less)				
Power consumption	3.5W (Max)				
Lens mount	C-mount				
Dimensions	44mm (W) ×29mm (H) ×70mm (D) ✻Not including protrusion				
Weight	Approx. 120g				
Regulations	CE, FCC				

Resolution (Mega pixel)	VGA (0.3M)	XGA (0.8M)	SXGA (1.5M)	UXGA (2M)
Frame rate	90fps	36fps	20fps	15fps
Model	CSGV90CC3-B	CSGX36CC3-B	CSGS20CC2-B	CSGU15CC18-B

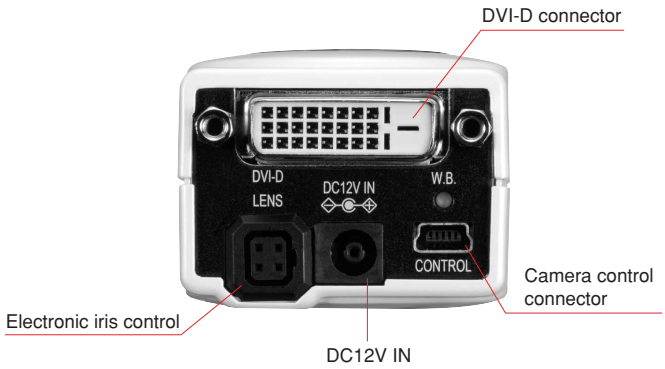
Color models

Item \ Model	CSGV90CC3-B	CSGX36CC3-B	CSGS20CC2-B	CSGU15CC18-B
Image sensor	all-pixel-data-readout interline transfer CCD			
Effective pixels	659 (H) ×494 (V)	1034 (H) ×779 (V)	1392 (H) ×1040 (V)	1628 (H) ×1236 (V)
Scanning area	4.88 (H) mm×3.66 (V) mm (1/3type)	4.81 (H) mm×3.62 (V) mm (1/3type)	6.47 (H) mm×4.84 (V) mm (1/2type)	7.16 (H) mm×5.44 (V) mm (1/1.8type)
Cell size (Square pixel)	7.4μm×7.4μm	4.65μm×4.65μm	4.65μm×4.65μm	4.4μm×4.4μm
Interface	Gigabit Ethernet IEEE802.3ab (1000 BASE-T) compatible			
Protocol	GigEVision Camera Interface Standard for Machine Vision Ver 1.0			
Scan system	Progressive			
Video format	GVSP_PIX_YUV411_PACKED：YUV4:1:1 12bit / GVSP_PIX_YUV422_PACKED：YUV4:2:2 16bit / GVSP_PIX_RGB8_PACKED：RGB 24bit			
	GVSP_PIX_BAYGB8 Raw (BayGB8) 8bit GVSP_PIX_BAYGB10 Raw (BayGB10) 10bit	GVSP_PIX_BAYGB8 Raw (BayGB8) 8bit GVSP_PIX_BAYGB10 Raw (BayGB10) 10bit		GVSP_PIX_BAYGB8 Raw (BayGB) 8bit GVSP_PIX_BAYGB10 Raw (BayGB) 10bit
Frame rate	90fps (Max)	36fps (Max)	20fps (Max)	15fps (Max)
Draft mode	—	1/3 254 line 86 fps	1/2 480 line 34fps	1/2 300 line 46fps
Sync	Internal			
Internal sync	36.0000MHz±100ppm			
Aspect ratio	4：3			
Sensitivity	Standard:1700lx, F5.6 5000K 1/90s Min:20lx, F1.4 (GAIN Maximum, video level 50%)	Standard: 2400lx, F5.6 5000K 1/36s Min:27lx, F1.4 (GAIN Maximum, video level 50%)	Standard:1400lx, F5.6 5000K 1/20s Min:18lx, F1.4 (GAIN Maximum, video level 50%)	Standard:1000lx, F8 5000K 1/15s Min:7lx, F1.4 (GAIN Maximum, video level 50%)
Gain	0 to +6dB (38steps)			
Gamma	ON (γ=0.65) /OFF (γ=1.0) switching			
White balance	2500 K to 6500 K (Manual：R-gain and B-gain can be set independently. / One Push Auto White Balance)			
Trigger signal	Low：0 to 0.5V High：2.0 to 24.0V Polarity Positive/Negative switching (Initial setting：Negative) Pulse width Minimum：50μs			
Electronic shutter	PRESET mode：1/100s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, 1/20000s Absolute value mode：1/20000s to 2s			
Power	DC12V ± 10% (ripple 100mVp-p or less)			
Power consumption	3.5W (Max)			
Lens mount	C-mount			
Dimensions	44mm (W) ×29mm (H) ×70mm (D) ✻Not including protrusion			
Weight	Approx. 120g			
Regulations	CE, FCC			

CSDW2M60CM28

Full HD Camera

2M pixel | 1080i / 1080p | Progressive | RoHS



Overview

This camera is an integral color camera incorporating a 1/2.8 type single chip CMOS sensor.It features a DVI-D video output interface for high-speed output of high-resolution video signals. The color camera unit can be connected directly to a monitor, making it ideal for medical and inspection applications.

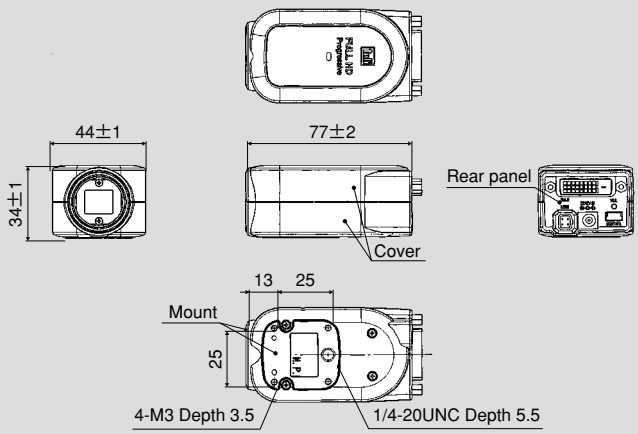
Features

- **High frame rate**
  Outputs Full HD size images at 1920×1080/60p or 1920×1080/60i.
- **Color reproductivity**
  Uses a primary color filter mosaic sensor for outstanding color reproduction.
- **DVI-D video output**
  DVI-D video output interface for easy direct connection to monitor.
- **Compact, light weight**
- **Camera control**
  It is possible to adjust by PC.
- **Digital crosshairs**
  Vertical and horizontal digital crosshairs can be displayed on the monitor.
- **Automatic iris control**
  DC-type auto-iris lenses can be controlled using a JEITA RC-5204 standard connector.
- **RoHS compliant**

Specifications

item \ model	CSDW2M60CM28
Image sensor	1/2.8 type CMOS image sensor
Effective pixels	2096 (H) ×1561 (V)
Output image size	1920 (H) ×1080 (V)
Cell size	2.5 μm (H) ×2.5 μm (V)
Interface	DVI-D
Scan system	Progressive
Sync system	Internal
Data clock	148.500/1.001MHz±100ppm
Aspect ratio	16 : 9
Video output	RGB each 8 bit
Sensitivity	Standard : 2000lx, F4 5000K Min : 24lx, F1.4 (Gain +12dB, Gamma 16, video level 50%)
Gain	Manual / Auto (-6dB to +12dB)
Set up level	-16LSB to +16LSB
White balance	Manual / One Push Auto / Full Auto / Preset
Gamma	17steps
Edge enhancement	8steps
Electronic shutter	1/60s～1/10,000s (9steps)
Power	DC 12V ±10% (ripple 50mVp-p or less) with DC IN connector DC 5V ± 5% (ripple 50mVp-p or less) with Camera control connector
Power consumption	Approx. 2.5W
Lens mount	C-mount
Dimensions	44 (W) ×34 (H) ×77 (D) mm ＊Not including protrusion
Weight	Approx.100g
Regulations	CE, FCC

Dimensions



CSDS60CM3

HD Camera

1.4M pixel | 720p | Progressive | RoHS

Overview

The CSDS60CM3 is an integral color camera incorporating a 1/3 type single chip CMOS sensor.
It features a DVI-D video output interface for high-speed output of high-resolution video signals.
The color camera unit can be connected directly to a monitor, making it ideal for inspection applications.

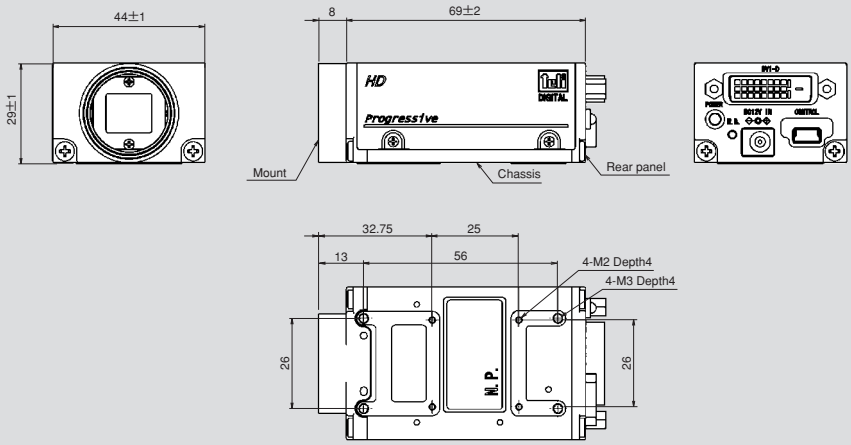
Features

- Outputs progressive video signals (up to SXGA) at 60 frames per second.
- Uses a primary color filter mosaic sensor for outstanding color reproduction.
- DVI-D video output interface for easy direct connection to monitor.
- Screen size is selectable between 1,280 (H) × 1,024 (V), 60 Hz and 1,280 (H) × 720 (V), 60 Hz.

Specifications

item \ model	CSDS60CM3
Image sensor	1/3type CMOS image sensor
Effective pixels	1329 (H) × 1049 (V)
Output image size	1280 (H) × 1024 (V) or 1280 (H) × 720 (V)
Cell size	3.63 μm (H) × 3.63 μm (V)
Interface	DVI-D
Scan system	Progressive
Sync system	Internal
Data clock	108.000MHz±100ppm
Aspect ratio	5 : 4 or 16 : 9
Video output	RGB each 8 bit
Sensitivity	Standard : 2000lx, F4 5000K Min : 6lx, F1.4 (Gain/Gamma : Max, video level 50%)
Gain	Manual / Auto (0 to +24dB)
Set up level	-16LSB to +16LSB
White balance	Full Auto / One Push Auto / Manual
Gamma	17steps
Contour correction	8steps
Electronic shutter	1/60s~1/10,000s (9steps)
Power	DC 12V ±10% (ripple 50mVp-p or less) with DC IN connector DC 5V ± 5% (ripple 50mVp-p or less) with Camera control connector
Power consumption	Approx. 2W
Lens mount	C-mount
Dimensions	44 (W) × 29 (H) × 77 (D) mm ＊Not including protrusion
Weight	Approx.100g
Regulations	CE, FCC

Dimensions



CS6910CL

0.6M pixel | CL | Progressive | RoHS

High-resolution CCD color camera

CAMERA Link

Overview

Integral type high-frame rate color camera using CCD with 630,000 effective pixels.

Features

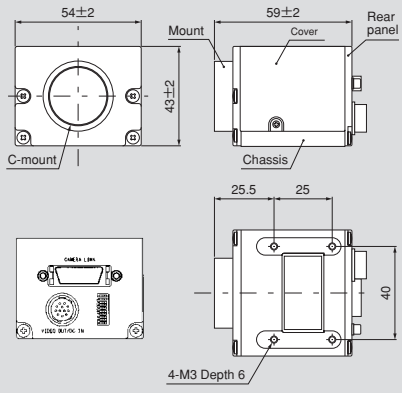
- **High-resolution [0.6Mega Pixels]**
- **High-frame rate [SXGA(1280×960), 30 fps]**
- **Random trigger shutter**
- **Compact, lightweight**

Specifications

Item \ Model	CS6910CL
Image sensor/ Effective pixels	＊1 Super CCD honeycomb 630,000 pixels / Chip size 5.0 (H) ×4.53 (V) mm (1/4.2 type)
Frame rate	SXGA：1280 (H) ×960 (V) 30fps / VGA：640 (H) ×480 (V) 30fps
Interface	RGB each 8 bit Camera Link
Resolution	Horizontal / Vertical: Approx. 600TV line or more (SXGA)
Video format	SXGA 30fps 49.0909MHz SXGA 15fps 24.5454MHz VGA 30fps 24.5454MHz
Aspect ratio	4：3
Scan system	Progressive
Sensitivity	Standard:3000lx, F8 (5100K) Minimum:30lx (SXGA, shutter speed:1/30s, γ=0.45, GAIN:+6dB, video level 50%)
Trigger in (Random trigger shutter)	Input level：Low:0 to 0.5V / High：2.0 to 5.0V Polarity：Positive / Negative bipolar
Sync system	Internal
White balance	Full Auto / One Push Auto / Manual
Gain	0 to +6dB
Electronic shutter	Auto：1/15000s to 1/30s/ Manual：1/15000s to 4s
Gamma	0.45/0.65/1.0 User setting
Power	DC12V
Power consumption	Approx. 3.6W
Lens mount	C-mount
Dimensions	54 (W) ×43 (H) ×59 (D) mm
Weight	Approx. 150g
Regulations	CE, FCC

＊1 Super CCD honeycomb is registered trademark of FUJIFILM Corporation.

Dimensions

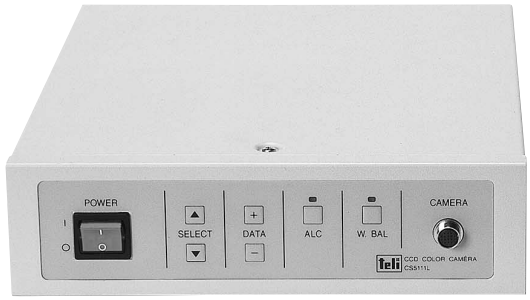


CS5111L

NTSC RoHS

CCD color camera (Remote Head type)

*Japanese market only



Overview

The CS5111L is a single-panel CCD color TV camera with a remote camera head incorporating a 1/2-inch 380,000 pixel complementary color CCD.

Features

●380,000 pixel CCD

Produces high-density images with horizontal resolution of 470 lines and minimal moiré and beat.

●External synchronization

Synchronization mode is automatically switched to external triggered when an external synchronization signal is input. Also permits VBS external synchronization, in addition to HD and VD external synchronization.

●ALC (Auto Level Control)

Produces optimal images for intensity fluctuations varying approximately 60,000-fold by controlling an ultra-high-speed electronic shutter (ELC) with a maximum speed of 1 million fps and auto gain control (AGC) with a microprocessor.

●Auto/manual white balance

●S connector output

●Electronic line/reticule marks

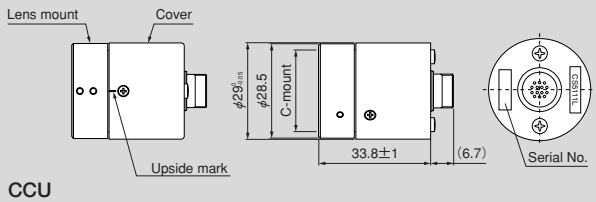
Two vertical and two horizontal electronic lines each or reticule marks can be mixed into the video signal and displayed on the monitor screen, facilitating positioning and image measurement.

Specifications

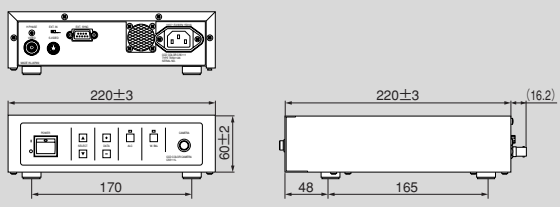
Item \ Model	CS5111L
TV system	NTSC
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V)
Scanning area	6.4 (H) ×4.8 (V) mm (1/2 type)
Resolution	525 lines
Sync system	Internal/External automatic switch-over
Scan frequency	15.734kHz (H) ×59.94Hz (V)
Sensitivity	Standard : 700lx, F8, 3000K Min : 3lx, F1.4 (3000K,AGC ON)
Video output	VBS : 1.0 V (p-p) /75Ω VS : 1.0 V (p-p) /75Ω C : 0.286V (p-p) /75Ω
Resolution	470TV lines (H) / 350TV lines (V)
S/N	46dB
Power	AC 100V ±10%
Current consumption	150mA or less
Lens mount	C-mount
Camera cable	3m, 5m (optional) Can be extended up to 12m.
Dimensions	Camera Head : φ29 x 33.8 (D) mm CCU : 220 (W) ×60 (H) ×240 (D) mm
Weight	Camera Head : Approx. 45g CCU : Approx. 2kg

Dimensions

Camera Head



CCU



Note: Not compatible with CS9001 series.

CS5260BD/BDP

CCD color camera

NTSC / PAL

RoHS

Lens is optional.

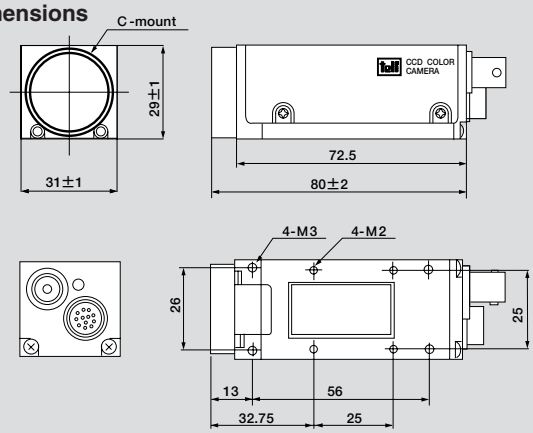
Overview

Integral type CCD camera incorporating 1/2-inch CCD with 380,000 effective pixels.
On-board DSP results in an ultra-compact, lightweight design for easy mounting on or incorporation into other devices.

Features

- Ultra-compact, lightweight, 31 mm x 29 mm x 80 mm, approx. 95 g
- VBS and Y/C output
- ELC function
- Single-button white balance adjustment

Dimensions



Specifications

Item \ Model	CS5260BD/BDP
TV system	NTSC / PAL
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V) / 752 (H) ×582 (V)
Scanning area	6.5 (H) ×4.84 (V) mm (1/2 type)
Scanning lines	525 lines / 625 lines
Sync system	Internal
Scan frequency	15.734kHz (H), 59.94Hz (V) / 15.625kHz (H), 50.0Hz (V)
Sensitivity	Standard:1000lx,F8,3000K, Min:4lx,F1.4 (GAIN AUTO)
Video output	VBS : 1.0 V (p-p) / 75Ω Y/C : VS:1.0V (p-p) / 75Ω, C:0.286V (p-p) /75Ω
Resolution	470TV lines (H) / 460TV lines (V)
S/N	46 dB
Power	DC 12V±10 %
Current consumption	Approx. 230 mA
Lens mount	C-mount
Dimensions	31 (W) ×29 (H) ×80 (D) mm
Weight	Approx. 95g
Regulations	CE, FCC

CS5270B

CCD color camera

NTSC

RoHS

Lens is optional.

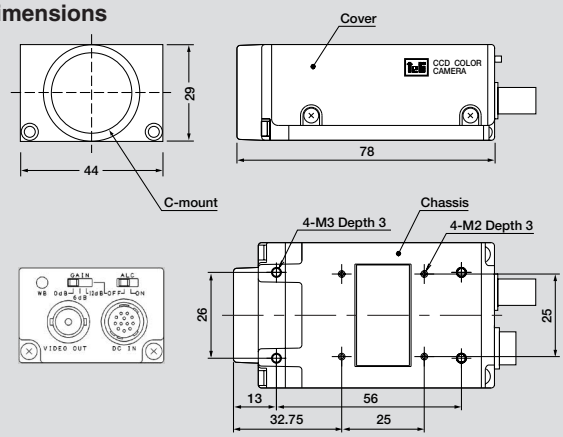
Overview

Integral type CCD camera incorporating 1/2-inch CCD with 380,000 effective pixels.
Uses a 10-bit A/D converter to achieve high-resolution video.
Compact, lightweight design makes it ideal for microscope TV monitoring applications and incorporation into other devices.

Features

- Compact, lightweight, 44 mm x 29 mm x 78 mm, approx. 160 g
- VBS and Y/C output
- 10-bit A/D converter
- ALC function
- Single-button white balance adjustment

Dimensions



Specifications

Item \ Model	CS5270B
TV system	NTSC
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V)
Scanning area	6.5 (H) ×4.84 (V) mm (1/2 type)
Scanning lines	525 lines
Sync system	Internal
Scan frequency	15.734kHz (H) , 59.94Hz (V)
Sensitivity	Standard:1000lx, F8, 3000K, Min:4lx, F1.4 (GAIN AUTO)
Video output	VBS:1.0 V (p-p) /75Ω Y/C : VS:1.0V (p-p) / 75Ω, C:0.286V (p-p) / 75Ω
Resolution	470TV lines (H) / 350TV lines (V)
S/N	46 dB
Power	DC 12V±10 %
Current consumption	Approx. 230 mA
Lens mount	C-mount
Dimensions	44 (W) ×29 (H) ×78 (D) mm
Weight	Approx. 160g
Regulations	CE, FCC

CS9001 series

NTSC / PAL　RoHS

CCD color camera (Remote Head Type)

Note: Not compatible with CS9000B series.

Overview

This range of products includes five different ultra-compact, lightweight camera heads for incorporation into a wide range of systems.

Features

- 380,000 (NTSC) / 440,000 (PAL) effective pixels
- VBS and Y/C output
- ALC function
- Full-Auto White Balance
- 3m and 5m camera cable length

Camera head

ϕ17 CSH9201

ϕ12 CSH9301

ϕ12 CSH9401

Camera cable

CPRC 4000B-03

3m

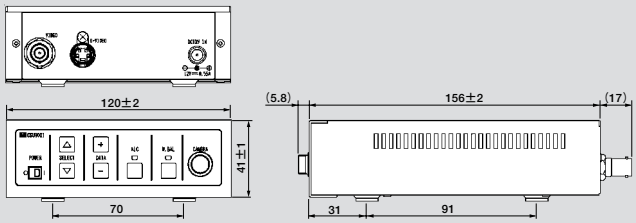
CPRC 4000B-05

5m

Can be extended up to 12 m with optional 7 m extension cable.

Dimensions

●CSU9001



Specifications

Item \ Model	CS9201/P	CS9301/P	CS9401-03/P-03
Camera head	ϕ17	ϕ12	ϕ12
Camera cable	3m or 5m		3m and 5m cables are connected directly from the camera head.
TV system	NTSC / PAL		
Image sensor	Interline CCD		
Effective pixels	NTSC：768 (H) ×494 (V) / PAL：752 (H) ×582 (V)		
Scanning area	6.4 (H) ×4.8 (V) mm (1/2 type)	4.8 (H) ×3.6 (V) mm (1/3 type)	3.6 (H) ×2.7 (V) mm (1/4 type)
Scanning lines	NTSC：525 lines / PAL：625 lines		
Sync system	Internal		
Scan frequency	15.734kHz (H), 59.94Hz (V)		
Sensitivity	Standard:700lx, F8 Min:3lx, F1.4	Standard:950lx, F8 Min:5lx, F1.4	Standard:2000lx, F8 Min:8lx, F1.4
Video output	VBS：1.0V (p-p) /75Ω, Chroma 0.286V (p-p) /75Ω		
Resolution	470TV lines (H), 350TV lines (V)		
S/N	46dB		
Power	DC 12V±10%		
Current consumption	Approx. 550mA		
Dimension CCU	120 (W) ×41 (H) ×156 (D) mm ✻Not including protrusion, Approx. 600g		
Weight head	Approx. 16g	Approx. 11g	Approx. 9g (Excluding cable)

CSB1100CL-10 / CSB4000CL-10A / CSB4000F-20

High-resolution CMOS B/W camera

1.3M pixel | CL | Progressive | RoHS

While Supplies Last

4M pixel | CL | Progressive | RoHS

4M pixel | IEEE 1394.a | Progressive | RoHS

Overview

Integral type machine vision B/W camera using a CMOS with 4 million and 1.3 million effective pixels. Main functions include a global shutter that exposes all pixels simultaneously, a Window of Interest (WOI) for scanning multiple selected areas, and a multi-slope function that provides wide dynamic range ＊.
Three models are available: the Camera Link standard CSB1100CL-10 and CSB4000CL-10A and the IEEE1394 standard CSB4000F-20.

Features

- 4 million and 1.3 million pixel types
- Window of Interest (WOI) function ＊
- Multi-slope function ＊
- Global shutter function ＊
- Sub-sampling function (CSB1100CL-10/CSB4000CL-10A)
- Digital interface (Camera Link/IEEE1394)

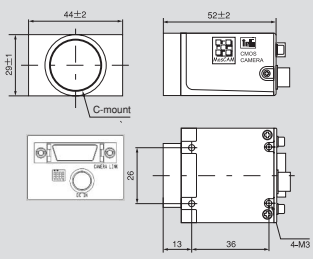
Specifications

Item \ Model	CSB1100CL-10	CSB4000CL-10A	CSB4000F-20
Image sensor	2/3 type CMOS Image sensor	Diagonal 17.4mm (1.1 type) CMOS Image sensor	
Effective pixels	1240 (H) x 1023 (V)	2008 (H) ×2047 (V)	2008 (H) ×2044 (V)
Pixel size	6.7μm x 6.7μm	6.0μm x 6.0μm	
Scanning system	All-pixel-data		
Sync system	Internal		
Frame rate	22.2fps (Global shutter, Under all pixel's read out mode exposure 60μ sec) ＊1	7.29fps (Global shutter, Under all pixel's read out mode exposure 60μ sec) ＊1	7.14fps (Global shutter, Under all pixel's read out mode exposure 60μ sec) ＊2
Aspect ratio	5 : 4	1 : 1	
Sensitivity	Standard:2600lx, F5.6 (exposure 16μsec)	Standard:2000lx, F4 (exposure 16μsec)	
S/N	47dB		—
Interface	Camera Link (10bit pixel clock : 33.3333MHz)		1394.a-IEEE Std2000 Conformity (400 Mbps)
Protocol	—		Specification Ver1.3
Video format	—		Format 7 / Special Format (in WOI)
Input signal	TRG (Shutter trigger)		
Electronic shutter	Shutter speed setting by command of Camera Link control signal (Approx. 60μs to 1sec)		User-defined shutter speed is selectable through IEEE1394 communication command (60〜1μsec)
Random trigger shutter	Shutter speed preset or shutter speed control by pulse width		
Power	DC12V ±10 %		Supply from IEEE1394 connector (From DC8V through DC30V)
Power consumption	Approx. 1.1W		Approx. 2.6W (in DC12V)
Lens mount	C-mount (The performance of may cause a deterioration of resolution or an image vignette depending on the lens.)		
Dimensions	44 (W) ×29 (H) ×52 (D) mm	54 (W) ×43 (H) ×59 (D) mm	54 (W) ×43 (H) ×94.5 (D) mm
Weight	Approx. 120g	Approx. 160g	Approx. 220g
Regulations	CE, FCC		

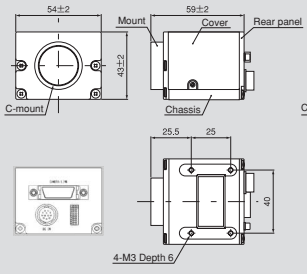
＊1 : Frame rates will vary depending on shutter mode, exposure times, and scanning area. Please inquire for detailed interface specifications.
＊2 : Frame rate for 1:1 connection. Frame rates will vary depending on exposure times and scanning area. Please inquire for detailed interface specifications.

Dimensions

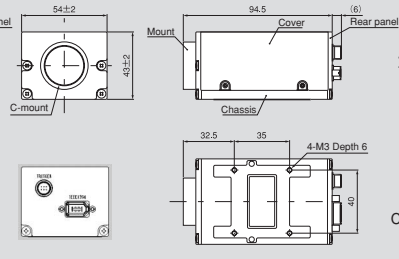
●CSB1100CL-10



●CSB4000CL-10A

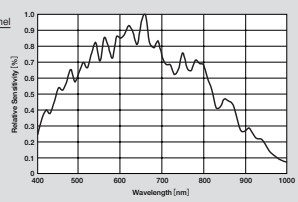


●CSB4000F-20

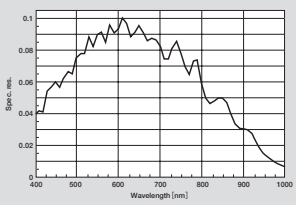


Spectral Response

CSB1100CL-10



CSB4000CL-10A/F-20



CS8581QF

0.3M pixel | IEEE 1394.b | Progressive | 4× Speed | RoHS

Quadruple speed CCD Full frame camera (Remote Head Type)

Built to order

1394 TRADE ASSOCIATION

CS8581QF

Overview

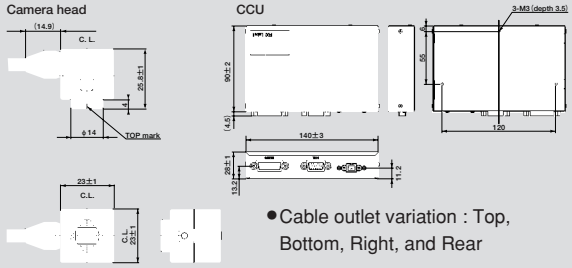
Capable of high-speed image output four times faster than regular analog NTSC cameras.
IEEE1394.b output : CS8581QF

Features

- High-speed image output (133 fps) with 300,000 effective pixels
- Square grid configuration CCD
- Random trigger shutter
- Scalable function
- Approx. 240 fps * for vertical 240 (1/2) partial scanning in 1/2 draft mode

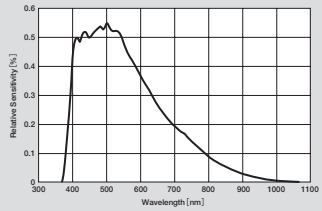
* Frame rates are theoretical values.

Dimensions



●Cable outlet variation : Top, Bottom, Right, and Rear

Spectral Response



Specifications

Item \ Model	CS8581QF
Image sensor	1/3 type All-pixel-data Interline
Effective pixels	640 (H) × 480 (V)
Cell size	7.4 × 7.4 μm
Scan system	Progressive
Sync system	Internal
Aspect ratio	4 : 3
Sensitivity	2000lx, F5.6
Video output	1394.b-IEEE Std2002 Conformity (800 Mbps) Compatible with 1394.a
Protocol	IIDC1394-based Digital Camera Specification ver1.31
Video format	Format7 Mode0 : Scalable Mono 8bit Format7 Mode1 : Draft Mono 8bit
External input signal Electronic shutter	TRG (trigger) control signal 1/5000 to 2s
Random trigger shutter	Fix mode / Pulse mode
Gamma	γ=1.0 (Fixed)
Lens mount	Special mount (M10.5 P0.5 Male)
Dimensions	Camera head : 23 (W) × 23 (H) × 26 (D) mm CCU : 148 (W) × 28 (H) × 90 (D) mm
Weight	Camera head : 24g, CCU : 250g
Regulations	CE, FCC

CS8541D

0.3M pixel | Progressive | 2× Speed | RoHS

Double-speed full-frame CCD camera (Remote Head type)

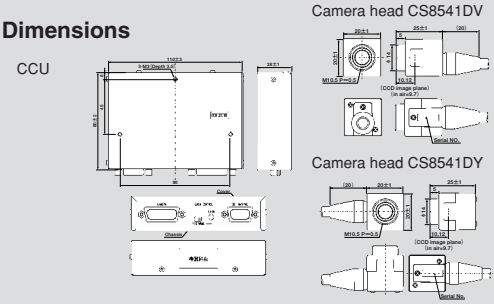
Overview

Double-speed full-frame camera with ultra-compact and lightweight remote camera head. Offers high-speed image output of 60 frames per second or 120 fields per second, corresponding to double the EIA standard, helping to reduce tact times.

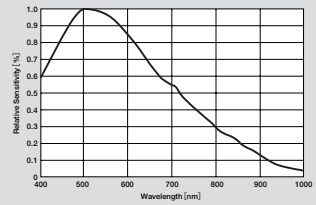
Features

- High-speed video output: 60 frames per second (progressive), 120 fields per second (2:1 interlacing)
- Ultra-compact, lightweight camera head, 20 mm x 20 mm x 25 mm, approx. 19 g
- 1/3-inch CCD with 330,000 effective pixels
- Square grid configuration CCD ● All pixel readout
- Random trigger shutter function ● Restart/reset function
- Multiple shutter function ● Partial scan function
- Programmable partial scan function (optional)
- External synchronization function

Dimensions



Spectral Response



Specifications

Item \ Model	CS8541D
Image sensor	1/3 type Interline CCD
Effective pixels	659 (H) ×494 (V)
Scanning area	4.8 (H) ×3.6 (V) mm
Scanning lines	525 lines
Sync system	Internal / External Auto Switchover
Scan frequency	Horizontal : 31.468kHz Vertical : 59.94Hz (Under progressive) or 119.88Hz (Under 2:1 interlace OPTION)
Sensitivity	Standard:400Lx, F5.6 Min:4 lx, F1.4 (GAIN MAX)
Video output	VS : 1.0V (p-p) / 75-Ω
Resolution	485 TV lines (H)
S/N	52dB (Initial setting)
Power	DC12V±10 %
Power consumption	Approx. 3.0W
Lens mount	Special mount (M15.5 P0.5 Male)
Camera cable length	1m
Dimensions	Camera head : 20 (W) ×20 (H) ×25 (D) mm CCU : 110 (W) ×28 (H) ×80 (D) mm
Weight	Camera head : Approx. 19g CCU : Approx. 190g
Regulations	CE, FCC

CS8550Di/-50
CS8550i-01/-51

Full-frame CCD camera

0.3M pixel | Progressive | 2× Speed

※CS8550Di
CS8550Di-50

RoHS

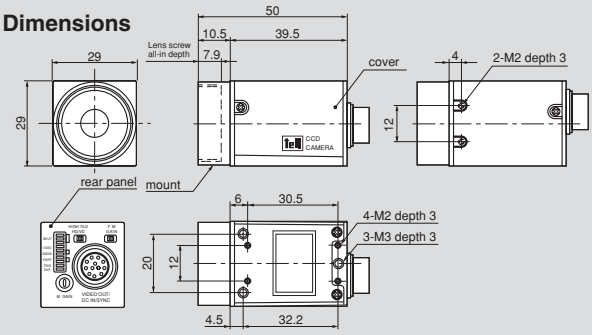
Overview

Compact, lightweight camera measuring 29 mm x 29 mm x 39.5 mm and weighing approximately 50 g.
The CS8550i-01/-51 outputs at 30 fps, and the CS8550Di-01/-50 outputs at 60 fps. The CS8550Di-01/-50 in particular helps to reduce tact times as it offers double the EIA standard video output.

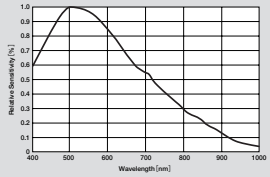
Features

● 1/3-inch CCD with 330,000 effective pixels ● Square grid configuration CCD ● All pixel readout ● External synchronization function ● Random trigger shutter function ● Restart/reset function ● Multiple shutter function ● Partial scan function ● Programmable partial scan function (optional) ● 2 types Video output mode

Dimensions



Spectral Response



Specifications

Item \ Model	CS8550Di/-50	CS8550i-01/-51
Image sensor	1/3 type interline CCD	
Effective pixels	659 (H) ×494 (V)	
Scanning area	4.8 (H) ×3.6 (V) mm	
Scannning lines	525 lines	
Sync system	Internal / External Auto Switchover	
Scan frequency	Horizontal:31.468kHz, Vertical:119.88 Hz (Under 2:1 interlace) or 59.94Hz (Under non-interlace)	Horizontal:15.734kHz, Vertical:59.94 Hz (Under 2:1 interlace) or 29.97Hz (Under non-interlace)
Sensitivity	Standard:400 lx, F5.6, Minimum:4 lx, F1.4 (Gain max)	Standard:400 lx, F5.6, Minimum:2 lx, F1.4 (Gain max)
Video output	VS; 1.0 V (p-p) / 75Ω	
Resolution	485TV lines (H)	
S/N	52dB (Initial setting)	
Power	DC12 V±10%	
Power consumption	Approx. 1.8W	Approx. 1.3W
Lens mount	C-mount	
Dimensions	29 (W) ×29 (H) ×39.5 (D) mm ※Not including protrusion	
Weight	Approx. 50g	
Regulations	CE, FCC	
V.Blanking (Non-interlace)	33H Blanking (CS8550Di/CS8550i-01) 20H Blanking (CS8550Di-50/CS8550-51)	

CS8560D
CS8570D

Full-frame CCD camera

0.3M pixel | Progressive | 2× Speed

RoHS

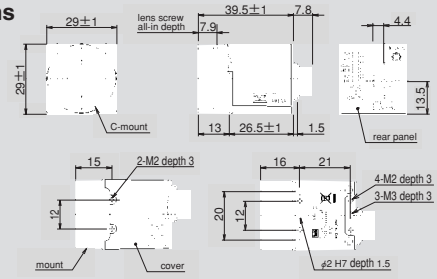
Overview

Integral type B/W camera using VGA format all pixel readout interline CCD (330,000 effective pixels). Ideal for high-speed, high-resolution image processing.

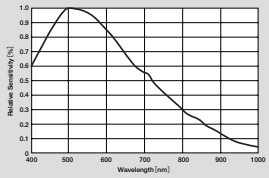
Features

● Ultra-compact, lightweight ● Double-speed readout
● All pixel readout ● Square grid configuration CCD
● External synchronization function
● Random trigger shutter function ● Restart/reset function
● Multiple shutter function
● Partial scan function

Dimensions



Spectral Response (CS8560D)



Specifications

Item \ Model	CS8560D	CS8570D
Image sensor	1/3 type All-pixel-data interline CCD	1/2 type CCD All-pixel-data interline CCD
TV system	Special format (Non-conforming to EIA)	
Scanning lines	525 lines	
Scan system	1/60s non-interlace mode 1/120s 2:1 interlace mode (Switching via rear-panel DIP SW)	
Sync system	Internal/External Auto Switch-over	
Aspect ratio	4 : 3	
Video output	VS : 1.0V (p-p) / 75 DC coupled, 1 line (AC as [Option])	
Resolution	485 TV line (H) 485 TV line (V) (350TV)	
S/N	52dB (Initial setting)	
Sensitivity	Standard: 400lx, F5.6 Min: 4lx, F1.4 (Gain: MAX, Approx50 video output)	
Gain	FIX (Initial factory setting) / Manual: Setting through GAIN VR (switch via rear-panel DIP SW)	
Gamma	γ=1.0 (Fixed)	
Power	DC12V±10% (Ripple voltage: 50mV (p-p) or less	
Power consumption	Approx.1.5W	
Lens mount	C-mount	
Dimensions	29 (W) ×29 (H) ×26.5 (D) mm (excluding projection)	
Weight	Approx. 42g	
Regulations	CE, FCC	

CS4000B series

EIA / CCIR RoHS

CCD B/W camera (Remote Head Type)

Note: Not compatible with CS4000 series.

Overview

B/W camera series with unrestricted camera head and CCU serial number matching.
The range includes five different ultra-compact, lightweight camera heads, both round and square, ensuring compatibility with a wide range of devices.

Features

● Ultra-compact, lightweight camera head. ● 380,000 effective pixels CCD ● Horizontal resolution 570 TV lines ● Highly bend tolerant cable ● Random trigger shutter function ● Special shutter function ● Restart/reset function External synchronization function

camera head

CSH4200B

CSH4300B

CSH4301B

CSH4310BY

camera cable

CPRC 4000B-03

3m

CPRC 4000B-05

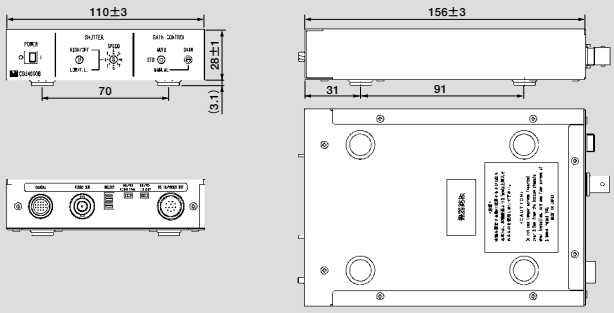
5m

Can be extended up to 12 m with optional 7 m extension cable.

Specifications

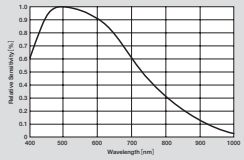
Item \ Model	CS4200B	CS4300B	CS4301B	CS4310BY
Camera head	ϕ17	ϕ12	ϕ12	20 (W)×20 (H)
Cable length	3m, 5m		3m	3m
TV system	EIA / CCIR (B:EIA, BC:CCIR)			
Image sensor	Interline CCD			
Effective pixels	768 (H)×494 (V)			
Scanning area	6.5 (H)×4.85 (V) mm (1/2 Type)	4.8 (H)×3.6 (V) mm (1/3 Type)		
Scanning lines	525 lines			
Sync system	Internal / External Automatic switch-over			
Scan frequency	15.734 kHz (H), 59.94 Hz (V)			
Sensitivity	Standard : 100 lx, F5.6 Minimum : 0.5 lx, F1.4	Standard : 150 lx, F5.6 Minimum : 0.75 lx, F1.4		
Video output	VS : 1.0V (p-p) / 75Ω			
Resolution	560TV lines (H)×410TV lines (V) (350TV lines)			
S/N	50dB (Standard)			
Power	DC12V±10%			
Current consumption	Approx. 400 mA			
CCU dimensions/Weight	110 (W)× 28 (H)× 156 (D) mm *Not including protrusion / Approx. 350g			
Camera head Dimensions/Weight	ϕ17×36.2 (D) mm Approx.16g	ϕ12×39.4 (D) mm Approx.11g	ϕ12×25.4 (D) mm Approx.16g	20 (W)×20 (H)×25.8 (D) mm Approx.11g
Regulations	CE, FCC			

Dimensions

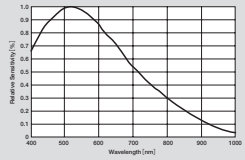


Spectral Response

CSH4200B/BC



CSH4300B/BC,4310B/BC



CS8310Bi/BCi

CCD B/W camera

EIA / CCIR

RoHS

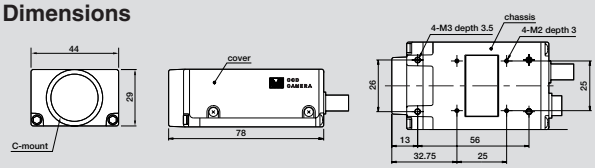
Overview

Integral type B/W camera using a 2/3-inch CCD with 380,000 effective pixels.（CCIR : 440,000 pixels）
Ideal for incorporation into other devices such as for FA, image measurement, and microscopy applications.

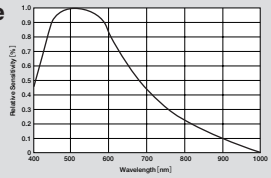
Features

- Compact, lightweight, 44×29×78 mm, approx. 130g
- Horizontal resolution 570TV lines（CCIR : 560TV lines）
- Highly S/N ratio 56dB
- Special shutter function
- Restart/reset function
- External synchronization function

Dimensions



Spectral Response



Specifications

Item \ Model	CS8310Bi/BCi
TV system	EIA / CCIR
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V) / 725 (H) ×562 (V)
Scanning area	8.8 (H) × 6.6 (V) mm (2/3 type)
Scanning lines	525 lines / 625 lines
Sync system	Internal / External Automatic switch-over
Scan frequency	15.734 kHz (H) ×59.94 Hz (V) / 15.625 kHz (H) ×50 Hz (V)
Sensitivity	Standard:100lx, F4, Minimum:0.3lx, F1.4
Gamma	γ=1.0 / 0.45 (Initial factory setting=1.0)
Video output	VS:1.0V (p-p) / 75Ω
Resolution	570TV lines (H) ×485TV lines (V) / 560TV lines (H) ×575TV lines (V)
S/N	56dB (Standard)
Power	DC12V±10%
Current consumption	Approx. 220 mA
Lens mount	C-mount
Dimensions	44 (W) ×29 (H) ×78 (D) mm
Weight	Approx. 130g
Regulations	CE

CS8311Bi/BCi

CCD B/W camera（Remote Head Type）

EIA / CCIR

RoHS

Lens is optional.

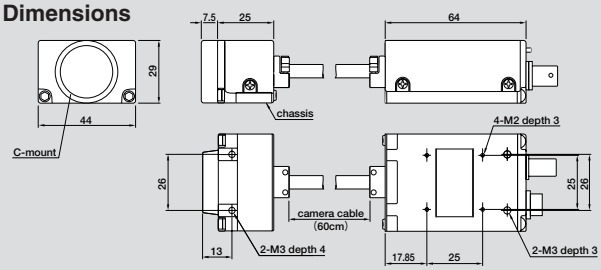
Overview

Separate head B/W camera using a 2/3-inch CCD with 380,000 effective pixels.（CCIR : 440,000 pixels）
Features a compact, lightweight camera head.

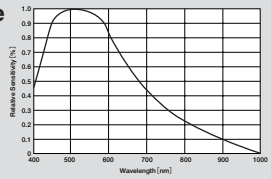
Features

- Ultra-compact, lightweight camera head, 44×29×33 mm, approx. 70g
- Ultra-compact, lightweight CCU, 44×29×64 mm, approx. 90g
- Horizontal resolution 570TV lines（CCIR : 560TV lines）
- High SN ratio: 56dB ● Special shutter function
- Restart/reset function
- External synchronization function

Dimensions



Spectral Response



Specifications

Item \ Model	CS8311Bi/BCi
TV system	EIA / CCIR
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V) / 752 (H) ×582 (V)
Scanning area	8.8 (H) × 6.6 (V) mm (2/3 type)
Scanning lines	525 lines
Sync system	Internal / External Automatic switch-over
Scanning System	15.734 kHz (H) ×59.94 Hz (V) / 15.625 kHz (H) ×50 Hz (V)
Sensitivity	Standard:100lx, F4, Minimum:0. lx, F1.4
Gamma	γ=1.0 / 0.45 (Initial factory setting=1.0)
Video output	VS:1.0V (p-p) / 75Ω
Resolution	570TV lines (H) ×485TV lines (V) / 560TV lines (H) ×575TV lines (V)
S/N	56 dB (Standard)
Power	DC 12V ±10 %
Current consumption	Approx. 220mA
Lens mount	C-mount
Camera Cable	Approx. 600mm
Dimensions	Camera head : 44 (W) × 29 (H) × 33 (D) mm Camera CCU : 44 (W) × 29 (H) × 64 (D) mm
Weight	Camera head : Approx. 70g, CCU : Approx. 90g
Regulations	CE

* CS8311BCi : Built to Order

CS3330Bi/BLi*

CCD B/W camera (Remote Head type)

* Japanese market only

EIA

Lens is option.

Overview

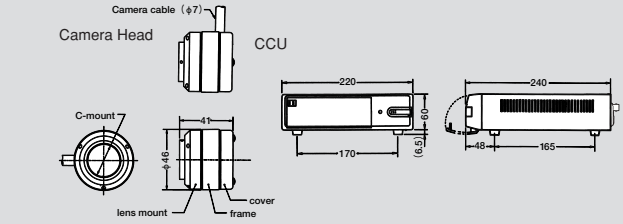
Separate head B/W camera using a 2/3-inch CCD with 380,000 effective pixels.

Features a compact, lightweight camera head; ideal for incorporation into other devices.

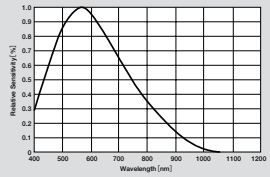
Feature

- Compact, lightweight camera head, ϕ 46×41 mm, approx. 130g
- Horizontal resolution 570TV lines
- Cursol generate(CS3330BLi)
- External synchronization function

Dimensions



Spectral Response



Specifications

Item \ Model	CS3330Bi/BLi
TV system	EIA
Image sensor	Interline CCD
Effective pixels	768 (H) × 494 (V)
Scanning area	8.8 (H) × 6.6 (V) mm (2/3 type)
Scanning lines	525 lines
Sync system	Internal / External Automatic switch-over
Scanning system	Horizontal : 15.734kHz, Vertical : 59.94Hz
Sensitivity	Standard : 100lx, F4 Minimum : 0.3lx, F1.4
Video output	VS : 1.0V (p-p) / 75Ω
Resolution	570TV lines (H) / 485 lines (V) (350TV lines)
S/N	56dB
Power	AC 100V ±10 %
Current consumption	Approx. 150mA
Lens mount	C-mount
Camera cable	Approx. 300mm
Dimensions	Head : φ46 ×41 (D) mm, CCU : 220 (W) × 60 (H) × 240 (D) mm
Weight	Head : Approx. 130g (Excluding Cable), CCU : Approx. 2.6kg

CS8600 Series

CCD B/W camera

EIA / CCIR

RoHS

■Sensor size 1/2 type

EIA	CCIR
CS8620i	CS8620Ci
CS8620Hi*	CS8620HCi*

■Sensor size 1/3 type

EIA	CCIR
CS8630i	CS8630Ci
CS8630H*	—

*H models feature IR Sensitive CCDs

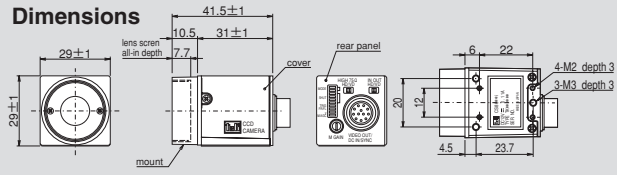
Overview

Ultra-compact, lightweight integral type B/W camera series using a CCD with 380,000 effective pixels.

Features

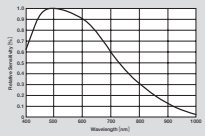
- Ultra-compact and lightweight, measuring 29 mm×29 mm×31 mm and weighing approx. 50 g
- High SN ratio: 60 dB (standard)
- Capable of imaging in the near-infrared range (CS8620Hi/20HCi 30H)
- Random trigger shutter function
- Special shutter function
- Restart/reset function
- External synchronization function
- Rear DIP switches

Dimensions

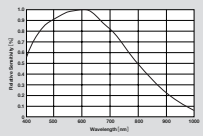


Spectral Response

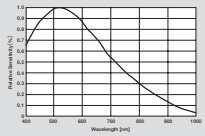
CS8620i/20Ci



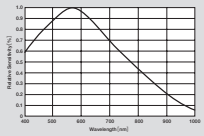
CS8620Hi/20HCi



CS8630i/30Ci



CS8630H



Specifications

Item \ Model	CS8600 series
TV system	EIA / CCIR
Image sensor	Interline CCD
Effective pixels	768 (H) ×494 (V) / 752 (H) ×582 (V)
Scanning area	6.5 (H) ×4.85 (V) mm (CS8620i/20Hi) 4.8 (H) ×3.6 (V) mm (CS8630i/30H)
Scanning lines	525 lines / 625 lines
Sync system	Internal / External Automatic switch-over
Scan frequency	15.734kHz (H), 59.94Hz (V) / 15.625kHz (H), 50.0Hz (V)
Sensitivity	Standard : 200lx, F5.6 Min : 0.2lx, F1.4 (CS8620i/30i) Standard : 400lx, F11 Min : 0.1 lx ,F1.4 (CS8620Hi) Standard : 200lx, F5.6 Min : 0.2 lx, F1.4 (CS8630H)
Video output	VS : 1.0V (p-p) / 75Ω
Resolution	570TV lines (H) / 560TV lines (H)
S/N	60dB (Standard)
Power	DC12V±10%
Power consumption	Approx. 1.3W
Lens mount	C-mount
Dimensions	29 (W) × 29 (H) × 31 (D) mm *Not Including protrusion
Weight	Approx. 50g
Regulations	CE, FCC

CS8620HCi ; CS8630H : Built to order

AS340B

Camera Scope

Overview

Compact color camera system for inspecting interiors of pipes and similar structures.
The camera head has an external diameter of 20 mm and is able to negotiate curved 40 mm pipes. The compact ultra-wide-angle lens gives a field of view of approximately 120˚, allowing pipe interiors to be inspected at an angle close to lateral images of the pipe walls. High-intensity white LEDs are included, ensuring sharp images for inspections.
The VR570 display device, which includes a recording function, is used. The inspection unit and recording unit both fit into a compact carrying case.

Feature

- Compact camera head (20 mm dia.)
- Rigid camera cable
- Cable drum with internal slip rings
- Cable feed length indication
- Submersible waterproof construction (IP68, water depth: 10 m)
- Image rotation function
- ALC (auto level control) function
- Portable carrying case
- Recodable to SD cards as moving image

Specifications

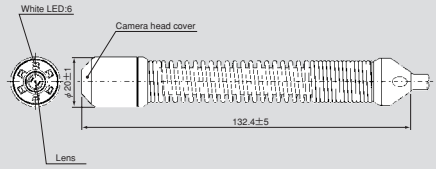
Item \ Model	AS340B
TV system	NTSC
Image sensor	250K 1/4 type CMOS F2.88 f=2mm
Lens	Specialty　wide-angle lens
LCD display	5.6type TFT- LCD
Water proof	IP68 depth 10m（only camera head）
Lighting	White LED illuminations
Power	DC12 V
Current consumption	Approx. 1.2A
Camera cable	ϕ6.1mm × 16 m（Active length：15m）
Dimensions	Camera Head：ϕ20 mm CCU：525（W）× 78.5（H）× 320（D）mm
Weight	Approx. 5.5kg

Configuration

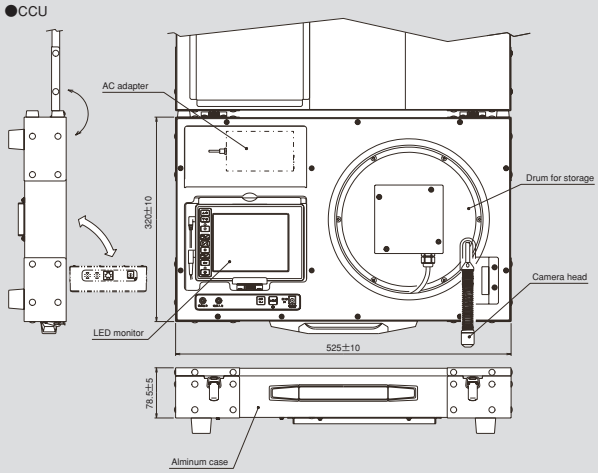
- AS340B ・・・・・・・・・・・・・・・・・ 1
- CCU ・・・・・・・・・・・・・・・・・・・ 1
- AC adapter ・・・・・・・・・・・・・・・ 1
- Focus adjustment tool ・・・・・・・ 1
- SD card ・・・・・・・・・・・・・・・・・ 1

Dimensions

●Camera head



●CCU



9LM20SB

RoHS

8.4-inch LCD B/W monitor

＊Japanese Market only

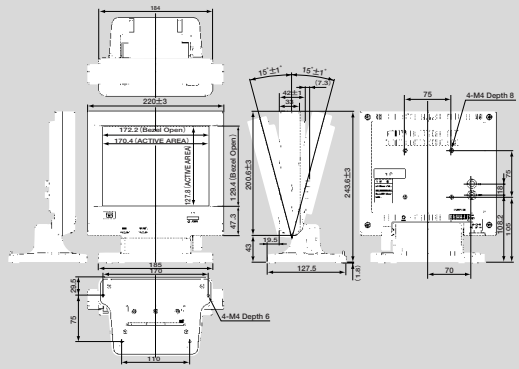
Overview

B/W LCD monitor featuring 8.4-inch LCD panel for video images (EIA compliant signal).

Features

● LED Back light ● Progressive scanning ● Gradation correction function; capable of displaying 7-bit equivalent gradation (128-gradation equivalent) (8 bit gradation for internal digital processing) ● Underscan display ● Line lock processing ● Allows cascade connection (auto terminating function) ● Compatible with VESA-compliant free mounting ● Energy-saving mode compliant with Energy Star standard

Dimensions



Specifications

Item \ Model		9LM20SB
LCD panel	LCD	8.4type TFT- LCD
	Pixel format	800 (H) ×600 (V)
	Gray scale	256-gradation
	Back light	Edge light type CCFL ×2
Display interface		EIA standard
Video input	Input signal	1.0Vp-p,(VIDEO 0.7Vp-p, SYNC 0.3Vp-p)
	Connector	BNC connector
Brightness		450cd/m² (typical) , 350cd/m² (Min)
Contrast ratio		600：1 (typical)
Input voltage		DC12V±0.5V
		AC100-240V±10%
Current consumption		0.7A or less
Operating temperature		0 to 35℃
Humidity		20 to 85% (no condensation)
Dimensions		220±3 (W)×250±3 (H)×130±1 (D) mm
Weight		less than 1.5 kg
Regulations		CE, FCC

＊Power supply adapter is optional

T05SSB003

5.6-inch TFT-LCD color monitor

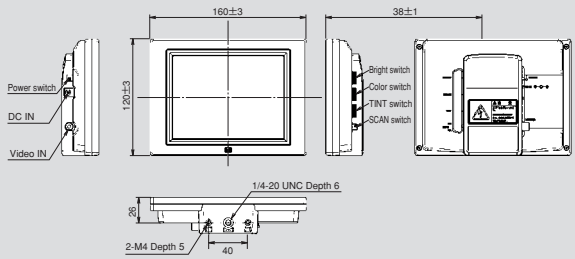
Overview

Enables viewing of composite video signals simply by directly connecting the video camera.

Features

● High contrast ● 320 (H) × 234 (V) dot RGB full-color display ● 180-degree rotatable display ● The unit can be mounted on a camera tripod.

Dimensions



Specifications

Item \ Model	T05SSB003
LCD panel	5.6type TFT-LCD
Display area	113.3 (H) ×84.7 (V)
Color	Full color (RGB 320 (H) ×234 (V) dot)
Back light	3×6 LED Back light
Video input	NTSC (M) ／PAL (B･G)
Input signal	VBS：1.0V (p-p) 75Ω
Connector	RCA pin connector × 1
Brightness	500cd/m² (Typ) ／360 cd/m² (Min)
Contrast ratio	300：1 (typical)
Input voltage	DC12V±0.5V
Current consumption	0.45A or less
Operating temperature	0 to 40℃
Humidity	20 to 85% (no condensation)
Dimensions	160 (W) ×120 (H) ×38 (D) mm
Weight	Approx. 400g
Regulations	CE

＊AC adapter is optional

T15MSA210-MD

15 type LCD color monitor

Overview

T15MSA210-MD is a color LCD monitor intended for healthcare applications that uses the 15 type TFT-LCD (ASV mode) panel. It can display PC images (ranging from VGA to SXGA) and video images (NTSC, PAL) on the XGA display LCD panel providing high brightness, high visibility and 16000000 colors. Also, it includes the audio circuit that outputs audio (stereo, mono) to the built-in speaker (2ch), and the analog resistive type touch panel, as standard.

Features

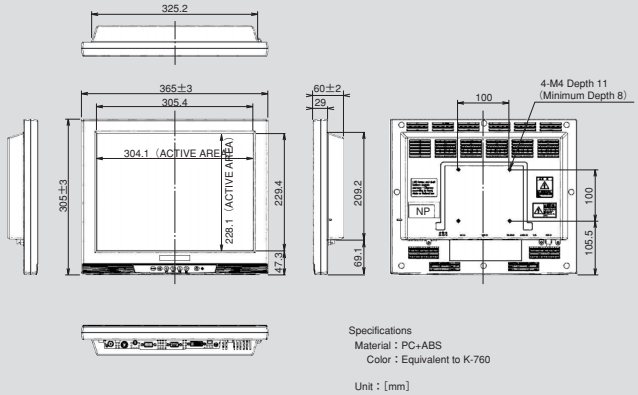
- Compatible with image input signals of four systems
- Incorporates the scaling function
- Can display two screens
- Compatible with the plug-and-play function

Specifications

Item \ Model	T15MSA210-MD
LCD panel	15type a-SiTFT-LCD
Display area	304.1 (H) ×228.1 (V) mm
Color	1024dot (H) ×768dot (V)
Back light	Cold Cathode tube×4
Display interface	VBS / Y/C / Analog RGB / TMDS
Input level	VBS 1V (p-p) /75Ω Y:1V (p-p) /75Ω C:0.286V (p-p) /75Ω R・G・B 0.7V (p-p) /75Ω・Based on DVI-D
Connector	BNC/Y/C/D-sub 15pin femail/DVI-D 24pin femail
Brightness	250cd/m² (typical) / 200cd/m² (Min)
Contrast ratio	600：1 (Typical)
Input voltage	DC12V±0.5V
Power consumption	2.8A or less
Operating temperature	0 to 35℃
Humidity	20 to 85% (non condensation)
External dimensions	365 (W) ×305 (H) ×60 (D) mm
Weight	3.9kg or less
Regulation	IEC60601-1, GM, cTUVus, CE

※AC adapter is optional

Dimensions



T06SHB007

RoHS

6.5-inch TFT-LCD color monitor

*Japanese market only

Overview

Offers high-precision, high-visibility display with power savings. Suitable for a wide range of applications from industrial to environmental uses.

Features

- Progressive display for video images also
- High brightness (400 cd/m²), 260,000-color sharp image
- Full VGA image (640 x 480 pixel) display

Specifications

Item \ Model		T06SHB007
Type		Video input (color)
Case		hard case
LCD panel	LCD	6.5type TFT- LCD
	Pixel format	640 (H) × 480 (V)
	Color	Approx. 260000 color
	Back light	Cold cathode
Display interface		NTSC
Video input	Input signal	VBS 1V (p-p) /75Ω Y/C Y:1V (p-p) /75Ω C:0.286V (p-p) /75Ω
	Connector	VBS BNC connector Y/C DIN-4pin connector
Brightness		400cd/㎡ (typical)
Contrast ratio		600 : 1 (typical)
Input voltage		DC 12V±0.5V
Power consumption		15W or less
Operating temperature		0 to 35℃
Humidity		20 to 85% (no condensation)
Dimensions		205 (w) × 155 (H) × 40 (D) mm
Weight		Approx. 1.3 kg (Excluding option)

※AC adapter is optional

Monitor/Display

VR570

Image Recorder

Overview

This device enables recording and playback of video (mp4) and still images (jpg) from an SD/SDHC card. Connect an analog (NTSC/PAL) color TV camera and monitor and review video and images using the LCD monitor.

Features

- Video is encoded using the H.264 image compression format for high-quality images at low bit rates.
- Still images can be recorded even while recording or playing back video.
- Supports SDHC cards of up to 32 GB. Extended recording (approximately 24 hours in standard resolutions).
- Images recorded can be played back on a PC using any media player that supports MP4.
- Uses 5.6-inch LCD monitor for easy viewing.

* Individual files cannot exceed 4 GB or 180 minutes in length.
* Because the video recording formats are different, video recorded on VR560SD cannot be played back on the VR570.

Specifications

Item \ Model		VR570
LCD		5.6type TFT-LCD
Video input		Analog video signal NTSC / Pal compatible
Resolution		960 (H) ×234 (V)
Display area		113. 3 (H) ×84.7 (V) mm
Recording quality	Still images: JPEG	Full:640×480 (NTSC), 768×576 (PAL) Small:320×240 (NTSC), 384×288 (PAL)
	Video: MPEG-4 (H.264 High Profile)	Full:720×480 30fps (NTSC), 720×576 25fps (PAL) Small:320×240 30fps (NTSC), 360×288 25fps (PAL)
Storage media		SD card up to 2 GB, SDHC card up to 32 GB *Individual files cannot exceed 4 GB or 180 minutes in length.
	Recommended SD/ SDHC card	Toshiba SD memory card SD-B series Transcend:TS1GSDC,TS2GSDC,TS4GSDHC6～TS16GSDHC
Video input/output signal		RCA PIN jack input×1, output×1
Power supply		DC12V±5% Max. 900mA (without camera)
Power consumption		8W
External dimensions		170 (W) ×120 (H) ×40 (D) mm
Weight		Applox. 570g

Power supply adapter (option)

CA130D/CA130D-01

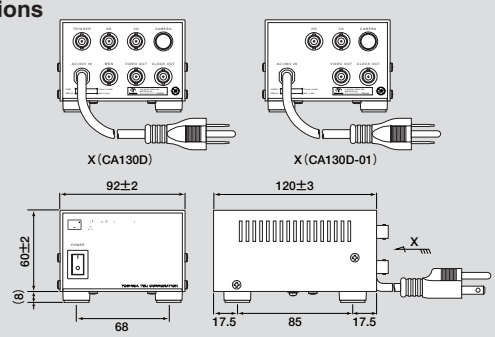
Ideal for use with image processing units having BNC input/output connectors. Used with composite 12-core power supply cable.

＊Japanese market only

■Specifications

Item \ Model	CA130D/CA130D-01
Input voltage	AC100V±10%　50/60Hz
Output voltage	DC12V±5%
Output current	0.9A (At the maximum ratings)
Power consumption	Approx. 28VA (At the maximum ratings)
Dimensions	92 (W) ×68 (H) ×120 (D) mm
Weight	Approx. 1kg

Dimenions



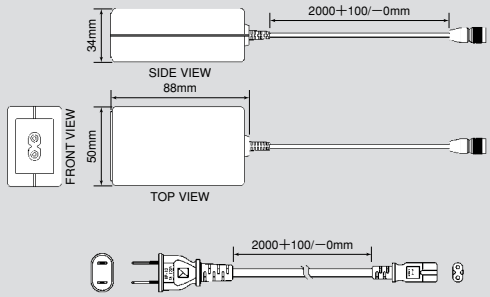
STD-12020T-H

Ideal for internally synchronized cameras.

■Specifications

Item \ Model	STD-12020T-H
Input voltage	AC100V to 240V　47 to 63Hz
Output current	DC12V±5%
Power current	2.0A (At the maximum ratings)
Dimensions・Weight	50 (W) ×34 (H) ×88 (D) mm　Approx.200g
Regulations	UL/CUL/GS/PSE/BSMI/RCM/CCC

Dimenions



CA300

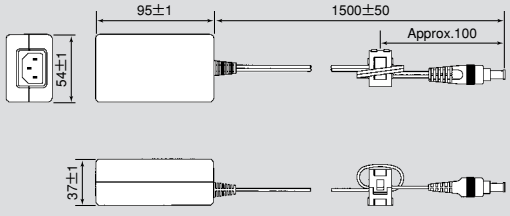
Only for CS9001 Series
To need power cable
'APC1025-01P'

＊Power cable is optional

■Specifications

Item \ Model	CA300
Input voltage	AC100V to 240V±10%
Output voltage	DC12V
Output current	1.3A
Dimensions	95 (W) ×37 (H) ×54 (D) mm
Weight	CA300 Approx. 240g　APC1025-01P 250g
Regulations	UL/PSE/CE

Dimenions

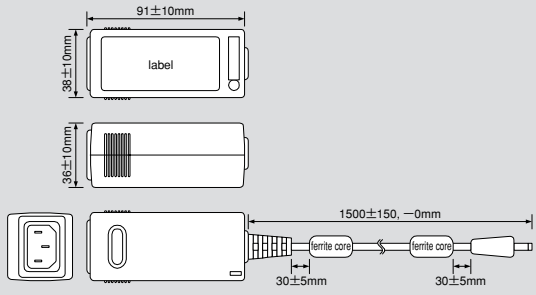


SPU16A-105ASN

■Specifications

Item \ Model	SPU16A-105ASN
Input voltage	AC100 to 240V
Output voltage	DC12V±10%
Output current	Max. 1.25A
Dimensions	38 (W) ×36 (H) ×91 (D) mm
Weight	Approx. 165g

Dimenions



Power supply, Cable,Camera mounting kit

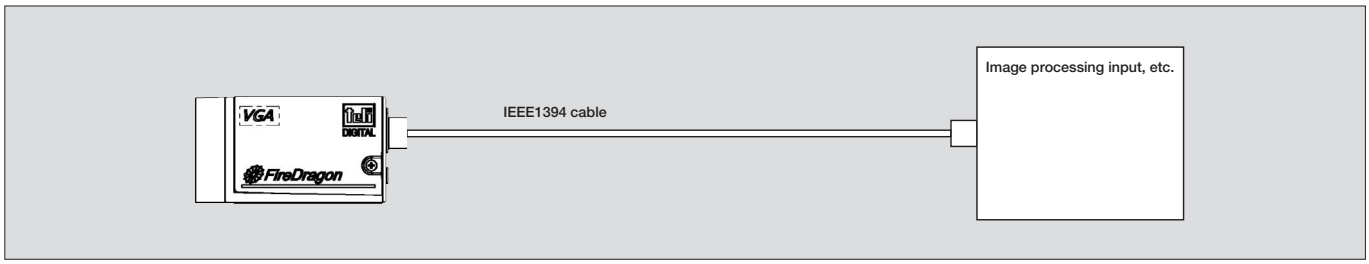
Model \ Accessories		Power supply adapter				Cable (adapter–camera)				Camera Cable (CCU-Camera Head)		Camera mounting kit	Remarks	
		STD-12020T-H	CA130D	CA130D-01	CA300	CPC3440	CPRC8300	CPRC3700	CPC3910	CPRC4000B	CPC4000B-07J			
					Power cable is Optional (APC1025-01P)	Normal 12Pin-12Pin	Highly flexible type		Normal 12Pin-6Pin	Highly flexible cable for Remote Head type	Extension cable for Remote Head type			
Dragon Family	FireDragon	Power supply via IEEE1394 cable				IEEE1394.b cable						CPT1100CL		
	GiantDragon		○	○					○			CPT8420		
CleverDragon (non-PoCL)	size:29×29×26.5		○	○					○			CPT8560	Power supply via Camera Link cable	
	CSCU30BC18-01	○	○	○		○	○	○				CPT4000CL		
	CSCU30CC18-01	○	○	○		○	○	○				CPT4000CL		
	CSCQS15BC23	○	○	○		○	○	○				CPT4000CL		
	CSCQS9CC23	○	○	○		○	○	○				CPT4000F		
	CSCQS15CC23	○	○	○		○	○	○				CPT4000F		
	CSC12M25BMP19-01B	○	○	○		○	○	○				CPTC12M		
	CSC12M25CMP19	○	○	○		○	○	○				CPTC12M		
Color camera	CS6910CL	○	○	○		○	○	○				CPT4000CL		
	CS6940CL	○	○	○		○	○	○				CPT4000CL		
	CS5111L	Built-in power supply				Attached power supply cable				○	○	CPT3130	Accessory CPRC4000B-03	
	CS5260BD	○*	○*	○*		○	○	○				CPT8420	*When power supply is used, Y / C output is not available.	
	CS5270B	○*	○*	○*		○	○	○				CPT8420		
	CS9201/E				○					○	○	CPT5130		
	CS9221/E				○					○	○	CPT3130		
	CS9301/E				○					○	○	CPT6100		
	CS9401-03/-05				○						○	CPT6100	Camera cable direct output	
	CS9501-03/-05				○						○	—		
	CSDS60CM3			○		Dedicated (CPCDS60CM3)						CPT8420		
	CSDW2M60CM28			○		Dedicated (CPCDS60CM3)						CPT8420	Dedicated AC adapter (SPU16A-105)	
B/W Camera	CSB1100CL-10		○	○					○			CPT1100CL		
	CSB4000CL-10A	○	○	○		○	○	○				CPT4000CL		
	CSB4000F-20	Power supply via IEEE1394 cable				IEEE1394.a cable						CPT4000F		
	CS3330Bi/BLi	Built-in power supply				Attached power supply cable						Dedicated	Attachment tool included	
	CS3910BH		○	○		○	○	○				CPT3910		
	CS3920		○	○					○			CPT3910		
	CS3930UV		○	○					○			CPT3910		
	CS3960DCL		○	○		○	○	○				CPT4000CL		
	CS3821D		○	○		○	○	○				See Remarks	Camera Head:CPT5130 CCU:CPT8420	
	CS8420i	○*	○	○		○	○	○				CPT8420	*When STD-12020T-H is used, the external synchronization is not available.	
	CS8430i	○*	○	○		○	○	○				CPT8420		
	CS8550Di/-50		○	○		○	○	○				CPT8550		
	CS8550i-01/-51		○	○		○	○	○				CPT8550		
	CS8560D		○	○		○	○	○				CPT8560		
	CS8570D		○	○		○	○	○				CPT8560		
	CS8581QF	Power supply via IEEE1394 cable				IEEE1394.b cable						—		
	CS8581QCL		○	○		○	○	○				—		
	CS4200B	○*	○	○		○	○	○		○	○	CPT5130	*When STD-12020T-H is used, the external synchronization is not available.	
	CS4300B	○*	○	○		○	○	○		○	○	CPT6100		
	CS4301B	○*	○	○		○	○	○			○	CPT6100	Camera cable direct output	
	CS4310B	○*	○	○		○	○	○			○	CPT4310A		
	CS4410B	○*	○	○		○	○	○			○	CPT4310A		
	CS8310Bi	○*	○	○		○	○	○				CPT8420		
	CS8311Bi	○*	○	○		○	○	○				CPT8420	Only tool is CCU	
	CS8541D		○	○		Dedicated (CPRC8541P15)						CPT8531A		
	CS8620i/Hi		○	○		○	○	○				CPT8600		
	CS8630i/H		○	○		○	○	○				CPT8600		

○ Available

Connection example

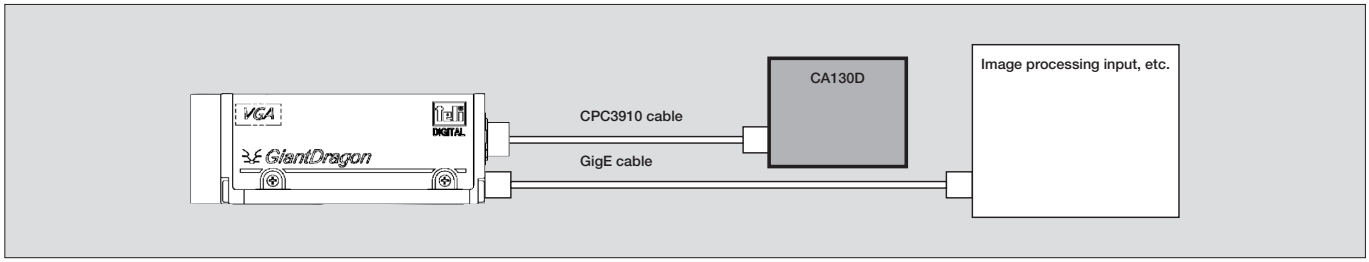
Example: 1

Fire Dragon



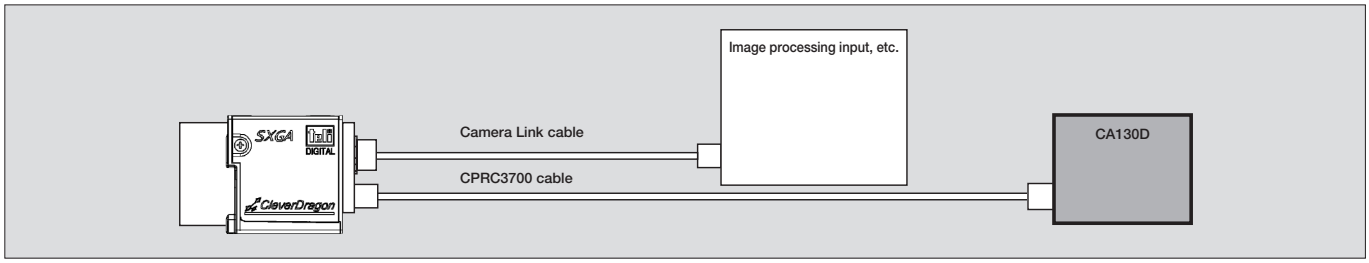
Example: 2

Giant Dragon



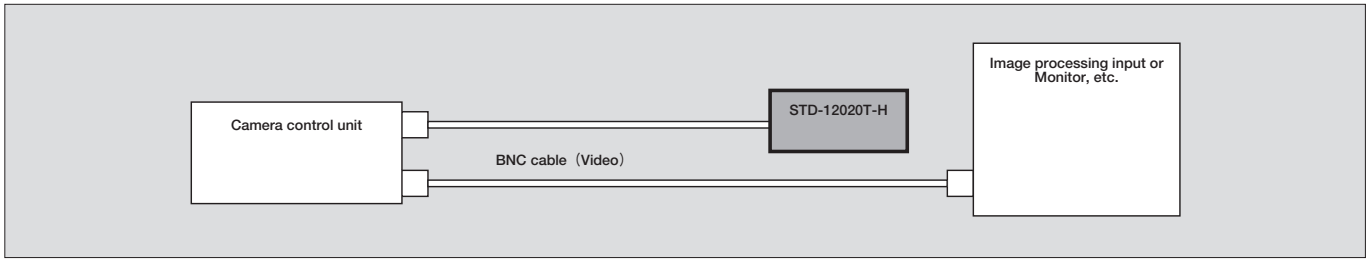
Example: 3

Clever Dragon（non-PoCL）／Camera Link



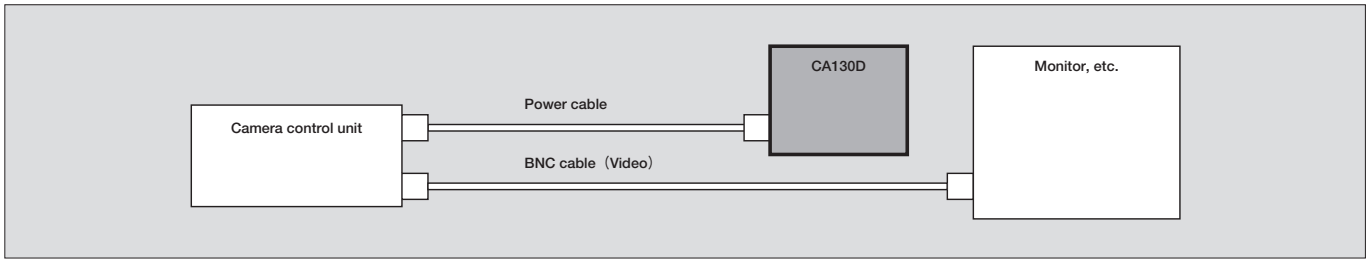
Example: 4

Analog Camera



Example: 5

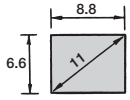
Analog Camera (Monitoring)



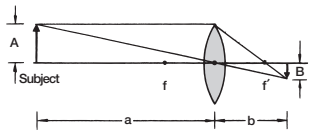
Lenses

◎TV camera and lens selection

TV cameras can be used with various replaceable lenses, as with SLR still cameras. Just as one selects the lens and film to suit the desired purpose when photographing with SLR cameras, an appropriate TV camera and lens combination must also be selected. Here we describe the applicable procedures for using the Toshiba Teli CS8310Bi. The CS8310Bi imaging area measures 8.8 mm (H) × 6.6 mm (V), which corresponds to the film size of a still camera. The image is produced on this plane by a lens.



The standard focal length for the CS8310Bi (2/3-inch) TV camera lens is 16 mm (equivalent to 50 mm on an SLR camera). Lenses shorter than this are called wide-angle lenses, while longer lenses are called telephoto lenses.



a: Distance from subject to lens center (principal point)
b: Distance from lens center (principal point) to image plane
A: Subject size
B: Size of subject image on image plane
f: Lens focal length

Image measurement requires the use of close-up imaging, since the subject is normally small.

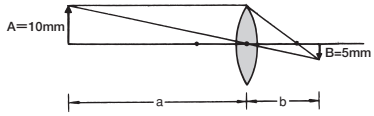
The subject, lens, and camera imaging sensor are configured as shown above. The following equation is satisfied if the system is in focus.

$$\frac{B}{A}=\frac{b}{a} \quad \cdots\cdots ① \qquad \frac{1}{a}+\frac{1}{b}=\frac{1}{f} \quad \cdots\cdots ②$$

The magnification M for the optical system here is B/A (magnification ratio).

A typical calculation is shown below.

Ex.1) Producing a 5 mm long image of a 10 mm long subject on the camera imaging area.



Let a = 100 mm. From (1), $b=\frac{a\,B}{A}=\frac{100\times 5}{10}=50\text{mm}$

From (2), $f=\frac{a\,b}{a+b}=\frac{100\times 50}{100+50}=33\text{mm}$

33 mm focal length lenses are not commercially available, so the closest, 35 mm, is used. In this case, an extension tube is used with a length of b - f = 15 mm.

Ex.2) What distances a and b are required to produce a 5 mm long image of a 10 mm long subject on the camera imaging area using a 50 mm focal length lens?

From (1): $\frac{B}{A}=\frac{b}{a}=\frac{1}{2}$ $b=\frac{a}{2}$

From (2): $\frac{1}{a}+\frac{1}{b}=\frac{1}{f}$ $a=\frac{f\,(A+B)}{B}=\frac{50\ (10+5)}{5}=150\text{mm}$

$b=\frac{a}{2}=75\text{mm}$

The length of the extension tube used should be b - f = 75 - 50 = 25 mm.

Note that the above calculations are for thin lenses. Actual lenses used are compound lenses, so variances arise due to differences in the lens centers (principal points) when viewed from the front or rear of the lens. (This is normally no more than a few mm, and so can often be ignored.)

1. CCTV lenses

The following two types of lens are currently used with CCTV cameras:

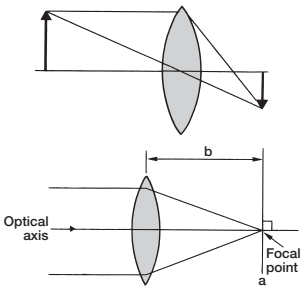
(1) C-mount lenses

Used with B/W and single-panel color cameras.

(2) Bayonet mount lenses

Used with 3CCD color and other cameras.

2. Focal length



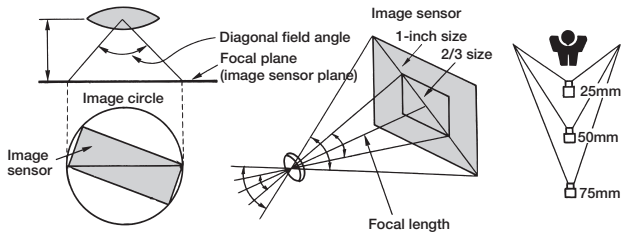
●Characteristics of convex lenses

(1) Light rays from a single point on the subject are refracted and focused to a single point.

(2) Light rays entering from an infinite distance parallel to the optical axis intersect at a point on the optical axis. This point on the axis is referred to as the "focal point," and the plane (a) containing this point and perpendicular to the axis is called the "focal plane." CCTV sensors are positioned on the focal plane. The distance (b) from the lens center (principal point) to the focal point is called the "focal length."

3. Field angle

Depending on the focal length, the extent of imaging on the image sensor will vary. The extent of imaging for this lens is called "field angle." Even for lenses with the same focal length, the field angle will vary for different image sensor sizes.

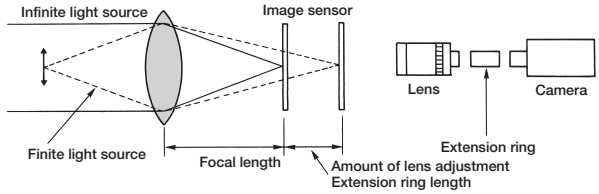


4. F number

Lens brightness is expressed as a ratio involving the lens aperture and focal length. Aperture ratio is the ratio of the effective lens aperture to the focal length and indicates the multiplying factor of the focal length when the effective lens aperture is 1. If the effective lens aperture is D and the focal length is f, the aperture ratio is expressed as D/f and a larger value indicates a brighter lens. The inverse of the aperture ratio is called the F number, and for convenience, lens brightness is expressed as an F number (e.g., F1.4).

5. Closeup filming

The following two methods exist for imaging at a distance shorter than the minimum distance for the lens.



(a) Using an extension ring

When incident light on the lens forms an image, light from a finite source will form an image further from the lens than for light from an infinite source, as shown in the figure above. The lens must therefore be extended to ensure focus. An extension ring is used when imaging subjects closer than the minimum distance for the lens.

(b) Using a close-up lens

Close-up imaging is made possible by mounting a close-up lens on the front of the lens being used.

6. Digital magnification

This is the ratio of the size of the CCD camera imaging area to the monitor.

■Correlation between 2/3-inch CCD and monitor TV magnification

2/3-inch CCD	5-inch monitor	9-inch monitor	12-inch monitor	14-inch monitor	15-inch monitor
Horizontal 8.8 mm	Approx. 98	Approx. 176	Approx. 235	Approx. 280	Approx. 300
Vertical 6.6 mm	Approx. 73	Approx. 132	Approx. 176	Approx. 210	Approx. 225
Magnification (times)	Approx. 11	Approx. 20	Approx. 26	Approx. 31	Approx. 34

*Magnification is approximate due to monitor reflection variances.

■Range of focus for extension ring length and focal length

Lens focal length and subject distance		f=12.5mm	f=25mm	f=50mm	f=75mm	f=8.5mm	f=16mm
		inf.0.3m	inf.0.6m	inf.1.0m	inf.1.2m	inf.0.2m	inf.0.5m
Extension ring length	0.5mm	36cm~20cm	129cm~43cm			19cm~12cm	56cm~28cm
	1.0mm	20cm~14cm	67cm~34cm			11cm~9cm	30cm~20cm
	1.5mm (1+0.5)	15cm~12cm	46cm~28cm	178cm~68cm		9cm~8cm	21cm~16cm
	5.0mm	8cm~8cm	17cm~15cm	60cm~41cm	129cm~68cm		9cm~8cm
	10mm		11cm~10cm	34cm~21cm	71cm~50cm		6cm~6cm
	15mm		9cm~8cm	26cm~23cm	51cm~41cm		
	20mm		8cm~8cm	22cm~20cm	42cm~35cm		
	25mm (20+5)			19cm~18cm	36cm~32cm		
	30mm (20+10)			17cm~17cm	32cm~29cm		
	35mm (20+10+5)			16cm~16cm	29cm~27cm		
	40mm			15cm~15cm	27cm~25cm		
	45mm (40+5)				25cm~24cm		
	50mm (40+10)				24cm~23cm		
	55mm (40+10+5)				23cm~22cm		
	60mm (40+20)				22cm~21cm		
	65mm (40+20+5)				21cm~21cm		

*Focus will blur when zooming using an extension ring with a zoom lens.

◎Filters

ND filter

This filter adjusts light levels without altering the color temperature. ND filters include ND2, which adjusts light levels by one stop, ND4, which adjusts light levels by two stops, and ND8, which adjusts light levels by three stops. These filters preserve outstanding color fidelity.

PL filter

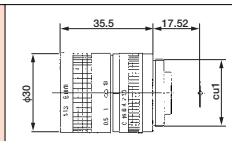
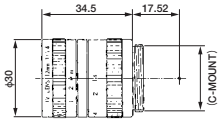
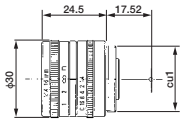
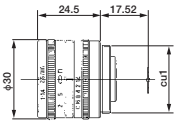
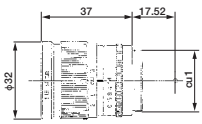
Filter effective for removing light reflected from glass surfaces.

IR filter

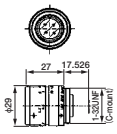
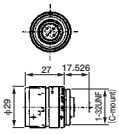
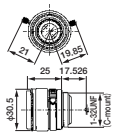
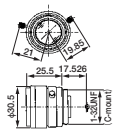
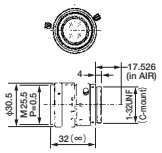
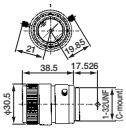
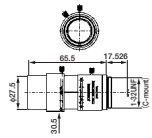
Filter for removing long wavelengths of near-infrared.

C-mount lens (option)

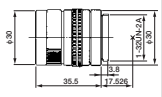
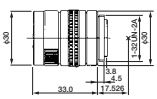
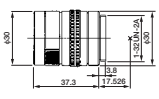
■Small Lens

Dimensions					
Model	**f8 F1.3**	**f12 F1.4**	**f16 F1.4**	**f25 F1.4**	**f50 F1.8**
CCD size	2/3 type	1/2 type	2/3 type	2/3 type	2/3 type
Angel of view (H)	57.6	29.9	30.8	19.83	10.52
Angel of view (V)	44.8	22.6	23.3	14.93	7.88
External dimension	ϕ30×34.5	ϕ30×34.5	ϕ30×24.5	ϕ30×24.5	ϕ30×37
Weight	55 g	56 g	40 g	40 g	55 g
Remarks	w/Lock	w/Lock	w/Lock	w/Lock	w/Lock

■Small Lens

Dimensions							
Model	**219HA**	**25HA**	**17HF**	**20HC**	**35HB**	**21HC**	**1A1HB**
CCD size	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type
Focal length	8	12	16	25	35	50	75
Aperture	1.4～16	1.8～16	1.4～16	1.6～16	2.1～22	2.8～22	3.9～32
Angel of view (H)	59.2	40.5	30.5	19.6	14.3	10.0	6.5
Angel of view (V)	45.1	30.5	28.2	15.0	10.8	7.3	5.1
External dimension	ϕ29×27	ϕ29×27	ϕ30.5×25	ϕ30.5×25.5	ϕ30.5×32	ϕ30.5×38.5	ϕ30.5×65.5
Weight	40 g	40 g	50 g	40 g	44 g	52 g	68 g
Remarks			w/Lock	w/Lock	w/Lock	w/Lock	w/Lock

■Small Lens

Dimensions			
Model	**H1212B**	**C1614A**	**B2514D**
CCD size	1/2 type	2/3 type	1 type
Focal length	12	16	25
Aperture range	F1.2～F22	F1.4～F22	F1.4～F22
Angel of view (H)	30.2	30.8	20.0
Angel of view (V)	22.6	23.4	15.0
External dimension	ϕ30×35.5	ϕ30×33	ϕ30×37.3
Weight	67 g	58 g	76 g
Remarks	w/Lock	w/Lock	w/Lock*

* Angel of view : 2/3 type

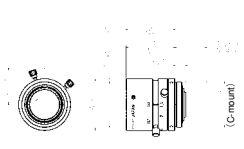
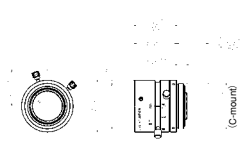
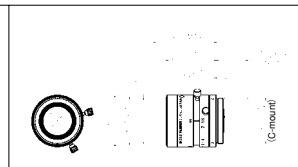
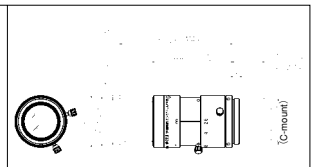
■Extension Tube set (Macro ring) EX-C6

Used in conjunction with C-mount lenses.
6-piece set consisting of 0.5 mm, 1 mm, 5 mm, 10 mm, 20 mm, and 40 mm rings.

■Extender (2x) 2-EX

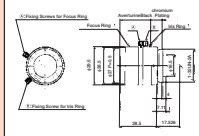
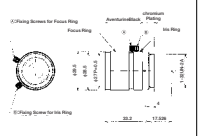
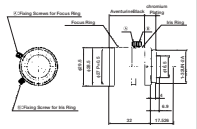
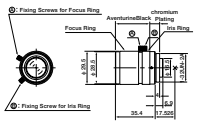
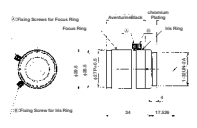
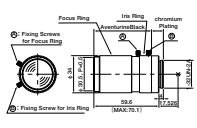
Used in conjunction with C-mount lenses.
Doubles the focal length (f). (Brightness decreases to 1/4 or less.)

■ Small Lens

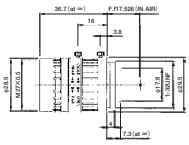
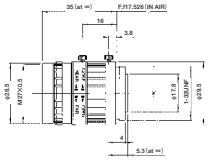
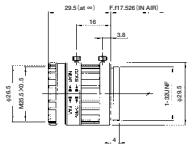
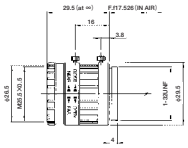
Dimensions				
Model	**M118FM08**	**M118FM16**	**M118FM25**	**M118FM50**
CCD size	1/1.8 type	1/1.8 type	1/1.8 type	1/1.8 type
Focal length	8	16	25	50
Aperture range	F1.4～16	F1.4～16	F1.6～16	F2.8～22
Angel of view (H･V)	50.8˚×38.6˚	25.9˚×19.5˚	16.6˚×12.5˚	8.3˚×6.2˚
External dimension	ϕ29×27.3	ϕ29×24.1	ϕ29×35	ϕ29×62.6
Weight	44 g	39 g	39 g	52 g

C-mount lens (option)

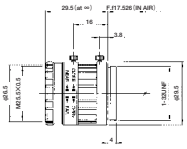
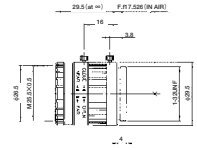
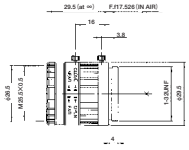
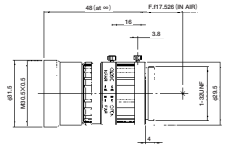
■High-resolution Lens

Dimensions						
Model	**H1214-M**	**C1614-M**	**C2514-M**	**C-3516-M**	**C5028-M**	**C-7528-M**
CCD size	1/2 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type
Focal length	12	16	25	35	50	75
Aperture range	F1.4～F16	F1.4～F16	F1.4～F16	F1.6～F22	F2.8～F22	F2.8～F32
Angel of view (H)	28.9	31.0	20.0	14.76˚	10.1˚	6.9˚
Angel of view (V)	21.9	23.4	15.1	11.10˚	7.6˚	5.18˚
External dimension	ϕ29.5×28.5	ϕ29.5×33.2	ϕ29.5×32.0	ϕ29.5×35.4	ϕ29.5×34	ϕ34×59.6
Weight	55 g	63 g	55 g	64 g	55 g	125 g
Remarks	w/Lock	w/Lock	w/Lock	w/Lock	w/Lock	w/Lock

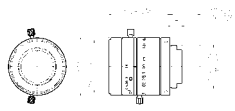
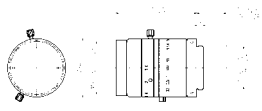
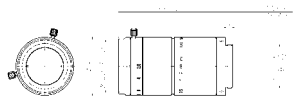
■High-resolution Lens

Dimensions				
Model	**DF6HA-1**	**HF9HA-1**	**HF12.5HA-1**	**HF16HA-1**
CCD size	1/2 type	2/3 type	2/3 type	2/3 type
Focal length	6	9	12.5	16
Aperture range	F1.2～Close	F1.4～Close	F1.4～Close	F1.4～Close
Angel of view (H)	56˚ 09’	52˚ 06’	38˚ 47’	30˚ 45’
Angel of view (V)	43˚ 36’	40˚ 16’	29˚ 35’	23˚ 18’
External dimension	ϕ29.5×36.7	ϕ29.5×35	ϕ29.5×29.5	ϕ29.5×29.5
Weight	55 g	55 g	45 g	45 g

■High-resolution Lens

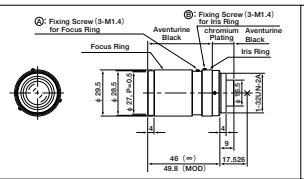
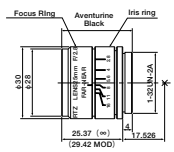
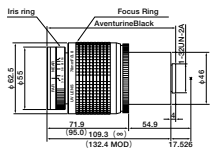
Dimensions				
Model	**HF25HA-1**	**HF35HA-1**	**HF50HA-1**	**HF75HA-1**
CCD size	2/3 type	2/3 type	2/3 type	2/3 type
Focal length	25	35	50	75
Aperture range	F1.4～Close	F1.6～Close	F2.3～Close	F2.8～Close
Angel of view (H)	19˚ 58’	14˚ 20’	10˚ 03’	6˚ 43’
Angel of view (V)	15˚ 02’	10˚ 46’	7˚ 33’	5˚ 02’
External dimension	ϕ29.5×29.5	ϕ29.5×29.5	ϕ29.5×29.5	ϕ29.5×48
Weight	45 g	45 g	45 g	55 g

■High-resolution Lens

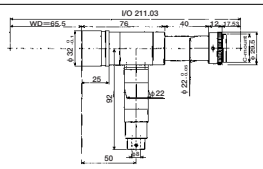
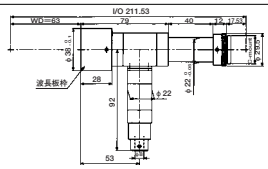
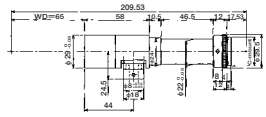
Dimensions			
Model	**23FM16SP**	**23FM25SP**	**23FM26SP**
CCD size	2/3 type	2/3 type	2/3 type
Focal length	16	25	50
Aperture range	F1.4～22	F1.4～22	F2.8～32
Angel of view (H･V)	30.9˚×23.4˚	20.0˚×15.1˚	10.1˚×7.6˚
External dimension	ϕ34×35.9	ϕ34×47.1	ϕ34×63
Weight	80 g	103 g	117 g

C-mount lens（option）

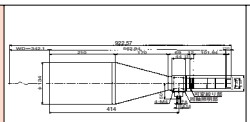
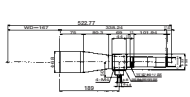
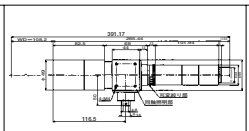
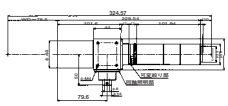
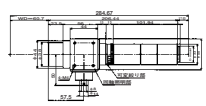
■Ultraviolet Lens

Dimensions			
Model	**H2520-UVM**	**B2528-UV**	**B7838-UV**
CCD size	1/2 type	1 type	1 type
Focal length	25	25	78
Aperture range	F2～F16	F2.8～F16	F3.8～F16
Angel of view（H）	14.6°	29.7°	9.45°
Angel of view（V）	11.0°	22.2°	7.09°
External dimension	φ29.5×46	φ30×25.4	φ62.5×109.3
Weight	78 g	33 g	446 g
Wavelength（nm）	250～450nm	A single wavelength±20nm between 250nm and 400nm	A single wavelength±20nm between 250nm and 400nm

■Standard Lens（1.1inch）

Dimensions			
Model	**MP-1F-65-S**	**MP-1F-65P**	**MP-2F-65**
Magnification	1×	1×	2×
Lighting	Coaxial Episcopic Illumination	Coaxial Episcopic Illumination（Polarized light type）	Coaxial Episcopic Illumination
WD	65.5mm	63mm	65.5mm
NA	0.063	0.063	0.1
Optical distortion	0.1%	0.1%	0.4%
Resolution	5.4μm	5.4μm	3.4μm
Effective F No.	8	8	10
Type of telecentric	object side	object side	object side

■Bilateral Telecentric Lens（1.1 inch）

Dimensions					
Model	**TCL0150-FU**	**TCL0300-FU**	**TCL0450-FU**	**TCL0600-FU**	**TCL0750-FU**
Magnification	0.15×	0.3×	0.45×	0.6×	0.75×
Lighting	Coaxial Episcopic Illumination	Coaxial Episcopic Illumination	Coaxial Episcopic Illumination	Coaxial Episcopic Illumination	Coaxial Episcopic Illumination
WD	342.1mm	167mm	108.2mm	78.5mm	60.7mm
NA	0.0055	0.011	0.0165	0.022	0.0275
Optical distortion	0.035%	0.012%	0.008%	0.015%	0.028%
Resolution	61.0μm	31.0μm	20.0μm	15.0μm	12.0μm
Type of telecentric	Bilateral	Bilateral	Bilateral	Bilateral	Bilateral

TFL2520

TFL Mount Lens

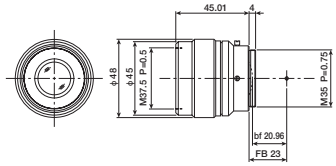
■Overview

High-resolution camera lens with optical performance ideal for image processing and mechanical reliability required for FA/machine vision applications.

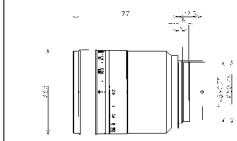
■Features

- High resolution over entire screen area. (Min. 160 lp/mm)
- Outstanding performance for close-up imaging with WD 200 mm.
- Transmissivity of at least 70% over the visible spectrum (400 nm to 760 nm)
- Focus-lock screw and fixed aperture for applications involving vibration
- Large screen dimensions (22 mm dia.) using TFL mounting
- Also compatible with C-mount using adapter ring.

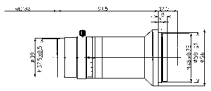
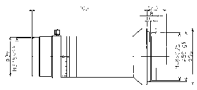
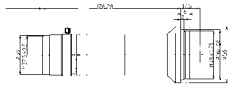
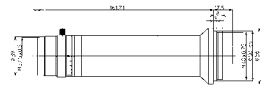
■Specifications

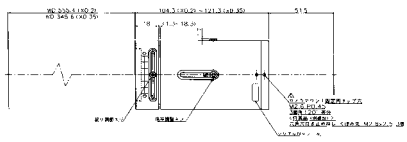
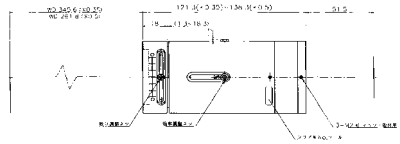
Dimensions	
Model	**TFL2520**
Focal length	25mm
Max aperture ratio	1：2
Image size	φ22mm
Iris	Fix
Flange back	23mm
WD	W.D.150mm～∞
External dimensions	φ48×49mm
Weight	Approx.185g
Mount	TFL Mount

TFL-II mount Lens (option)

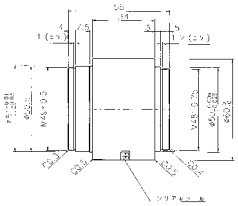
Dimensions	Model	FV5026W-TFL II
	Focal Length	50mm
	Max Aperture Ratio	1：2.6
	Image side	320 ～∞
	Resolving power (center)	200L／mm
	Optical Distortion	0.11%
	Max Image Format	φ45mm

Suitable camera CSC12M25BMP19-01B, CSC12M25CMP19

Dimensions				
Model	LS05	LS07	LS10	LS15
Magnification	0.5	0.7	1.0	1.5

Dimensions		
Model	ML-L02035	ML-L03505
Focal length	×0.2	×0.35	×0.35	×0.5
Max Aperture ratio	555.4±16.6	345.6±10.4	345.6±10.4	261.7±7.8
Iris range	less than ±0.1%	less than ±0.1%
Image circle	19.3μm	12.6μm	12.6μm	10μm
Flange back	F5.8～32	F6.6～36.6	F6.6～36.6	F7.4～41
Suitable camera	51.5	51.5

A special lens adapter TFL-2-MTS is required to use the lenses shown to the left.



Ø12 camera (M10.5 P0.5 male)Lens (option)

Suitable Camera CS9301, CS9401, CS4300B, CS4301B

■Standard Lens（Fixed Iris）

Model	CPL9300A021A	CPL9300A031A	CPL9300A041A
Focal length (mm)	f12	f17	f30
Aperture ratio	F8	F8	F8
External dimension (mm)	φ12	φ12	φ12
optics tube length (mm)	17.4	19.7	34.5
Model	CPL9300A021B	CPL9300A031B	CPL9300A041B
Focal length (mm)	f12	f17	f30
Aperture ratio	F11	F11	F11
External dimension (mm)	φ12	φ12	φ12
optics tube length (mm)	17.4	19.7	34.5
Model	CPL9300A021C	CPL9300A031C	CPL9300A041C
Focal length (mm)	f12	f17	f30
Aperture ratio	F5.6	F5.6	F5.6
External dimension (mm)	φ12	φ12	φ12
optics tube length (mm)	17.4	19.7	34.5
Model	CPL9300A021D	CPL9300A031D	CPL9300A041D
Focal length (mm)	f12	f17	f30
Aperture ratio	F4	F4	F4
External dimension (mm)	φ12	φ12	φ12
optics tube length (mm)	17.4	19.7	34.5

■Extension Tube Set （Macro Ring）

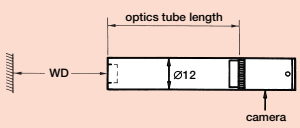
Used in conjunction with standard lenses.

- CPLEXC9300-06060912A
  4-piece set consisting of 6mm×2, 9 mm and 12mm rings.
- EXC-12-201005
  3-piece set consisting of 5mm, 10 mm and 20mm rings.

■C-mount Adapter

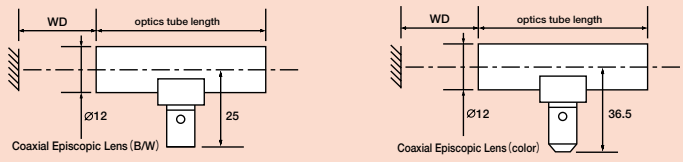
- CPL6100A1050CA

■High Magnification Lens



Model	Magnification	WD (mm)	optics tube length (mm)
MPL-05LS	0.5×	111	50
MPL-075LS	0.75×	108	80
MPL-1LS	1×	70.5	68
MPL-2LS	2×	90	68
MPL-3LS	3×	70	80
MPL-4LS	4×	70	98
MPL-5LS	5×	70	106

■Coaxial Episcopic Lens

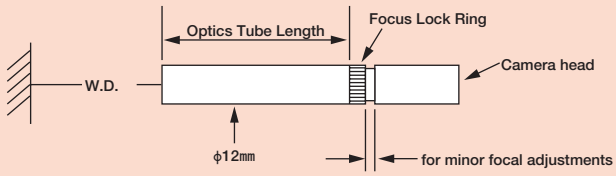


model		Magnification	WD (mm)	optics tube length (mm)
color	B/W			
MBL-2LSF	MBL-2LS	2×	90	68
MBL-3LSF	MBL-3LS	3×	70	80
MBL-4LSF	MBL-4LS	4×	70	98
MBL-5LSF	MBL-5LS	5×	70	106
MBL-6LSF	MBL-6LS	6×	64	116
MBL-7LSF	MBL-7LS	7×	58	128
MBL-8LSF	MBL-8LS	8×	56	137

Ø12 camera (M10.5 P0.5 male)Lens (option)

Suitable camera CS9301, CS9401, CS4300B, CS4301B

■Suitable Lens



※Minor focal adjustments are made with void dimensions of less than 1mm.

Model	Field of View (H×V) mm		Magnification	W.D. (mm)	Optical tube length (mm) ±0.3mm
JM1010	48	36	0.1×	325	38.0
JM2010	48	36	0.1×	180	21.5
JM3010	48	36	0.1×	122	19.0
JM1015	32	24	0.15×	223	39.5
JM2015	32	24	0.15×	122	22.5
JM3015	32	24	0.15×	82	19.5
JM1020	24	18	0.2×	173	41.0
JM2020	24	18	0.2×	94	23.5
JM3020	24	18	0.2×	61	20.0
JM1030	16	12	0.3×	122	44.0
JM2030	16	12	0.3×	65	25.5
JM3030	16	12	0.3×	41	21.0
JM1040	12	9	0.4×	96	46.5
JM2040	12	9	0.4×	50	27.0
JM3040	12	9	0.4×	31	22.0
JM1045	10.6	8	0.45×	88	48.5
JM2045	10.6	8	0.45×	46	27.5
JM3045	10.6	8	0.45×	27	23.0
JM1050	9.6	7.2	0.5×	81	50.0

Model	Field of View (H×V) mm		Magnification	W.D. (mm)	Optics tube length (mm) ±0.3mm
JM2050	9.6	7.2	0.5×	42	28.5
JM3050	9.6	7.2	0.5×	26	23.5
JM1060	8	6	0.6×	71	53.0
JM2060	8	6	0.6×	36	30.5
JM3060	8	6	0.6×	20	25.0
JM1072	6.6	5	0.72×	63	56.0
JM2072	6.6	5	0.72×	31	32.5
JM1080	6	4.5	0.8×	59	59.0
JM2080	6	4.5	0.8×	28	33.5
JM1090	5.3	4	0.9×	55	61.5
JM2090	5.3	4	0.9×	26	35.5
JM1100	4.8	3.6	1.0×	51	65.0
JM2100	4.8	3.6	1.0×	24	37.0
JM1006	80	60	0.06×	524	36.5
JM2006	80	60	0.06×	295	20.5
JM3006	80	60	0.06×	202	18.0
JM1007	66.6	50	0.072×	444	37.0
JM2007	66.6	50	0.072×	244	21.0
JM3007	66.6	50	0.072×	170	19.0

＊The field of view is when using a 1/3 size CCD.

■Suitable Lens（long W.D. model）

model	Field of View (H×V)		Magnification	W.D. (mm)	Optical tube length (mm) ±0.5mm
LJM4030	16	12	0.3×	250	80.0
LJM4040	12	9	0.4×	201	85.5
LJM4045	10.6	8	0.45×	185	88.5
LJM4050	9.6	7.2	0.5×	172	91.5
LJM4060	8	6	0.6×	152	97.5
LJM4072	6.6	5	0.72×	136	104.5
LJM4080	6	4.5	0.8×	128	109.0
LJM4090	5.3	4	0.9×	119	115.0
LJM4100	4.8	3.6	1×	112	121.0
JM1030 N2	16	12	0.3×	147	43.5
JM1040 N2	12	9	0.4×	120	46.5
JM1045 N2	10.6	8	0.45×	111	48.0
JM1050 N2	9.6	7.2	0.5×	102	50.0
JM1060 N2	8	6	0.6×	90	53.5
JM1072 N2	6.6	5	0.72×	81	57.5
JM1080 N2	6	4.5	0.8×	77	60.0
JM1090 N2	5.3	4	0.9×	72	63.5
JM1100 N2	4.8	3.6	1×	68	67.0
JM5100 N	4.8	3.6	1×	98	48.5
JM5200 N	2.4	1.8	2×	82	80.5
JM5300 N	1.6	1.2	3×	78	107.0

＊The field of view is when using a 1/3 size CCD.

■Suitable Lens（short W.D. model）

model	Field of View (H×V)	Magnification	W.D. (mm)	Optical tube length (mm) ±0.5mm
JM2100N	4.8×3.6	1.0×	44.0	29.0
JM2200N	2.4×1.8	2.0×	37.0	45.5
JM2300N	1.6×1.2	3.0×	33.0	62.0

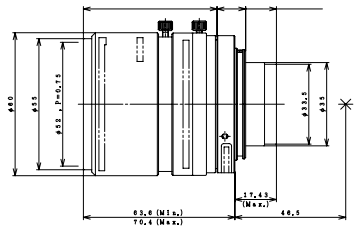
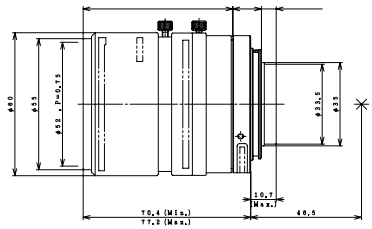
In addition to the magnifications above, we also support built-to-order manufacturing of 1.2x, 1.5x, 1.8x and 2.4x.

＊The field of view is when using a 1/3 size CCD.

F-mount Lens (option)

Suitable camera　CS8000CL, CSC12M25BMP19-01B, CSC12M25CMP19（Adapter is required）

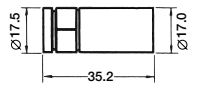
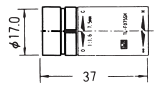
■F-mount Lens（option）

Dimensions		
model	**YF5028A-02**	**YF5028A-035**
Focal Length	50mm±5%（∞）	
Max Aperture Ratio	1：2.8（∞）	
Iris Range	F2.8～22（∞）	
Image circle	φ45	
Flange back	46.5	
Min～Max Magnification	0.15～0.23	0.28～0.40

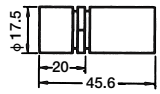
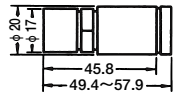
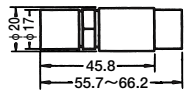
Ø17 camera (M15.5 P0.5 male)Lens (option)

Suitable camera　CS9201, CS3821D, CS4200B

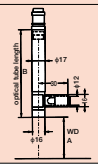
■ Small Lens

Dimensions		
Model	**TL-F040M**	**TL-F075SN**
Focal Length	4mm	7.5mm
Max Aperture Ratio	F2	F1.6

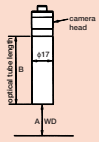
■Macro Lens

Dimensions			
Model	**TL-F250M1**	**TL-F250M2**	**TL-F250M3**
Focal Length	25mm	25mm	25mm
WD	104.9～90.8mm	115.3～76.9mm	77.3～66.5mm
Magnification	0.384～0.489	0.33～0.67	0.66～1.0

■Coaxial Episcopic Lens

Dimensions	model	Magnification	WD (Amm)	optics tube length (Bmm)
	**PBL-2LS**	2×	70	116
	PBL-3LS	3×	70	110.5
	PBL-4LS	4×	70	121
	PBL-5LS	5×	70	121
	PBL-6LS	6×	70	126
	PBL-7LS	7×	70	135
	PBL-8LS	8×	70	146.5

■high magnification lens

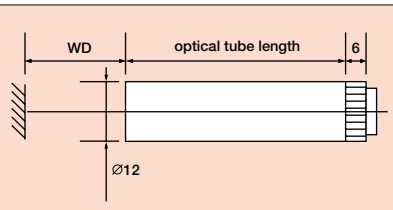
Dimensions	model	Magnification	WD (Amm)	optics tube length (Bmm)
	**PL-075LS**	0.75×	110	54
	PL-1LS	1×	78	89.5
	PL-2LS	2×	78	89.5
	PL-3LS	3×	70	110
	PL-4LS	4×	70	121
	PL-5LS	5×	70	121
	PL-6LS	6×	70	126

■C-mount Adapter　CPL5130A155CA

20m/m Cube camera (M10.5 P0.5 female)Lens (option)

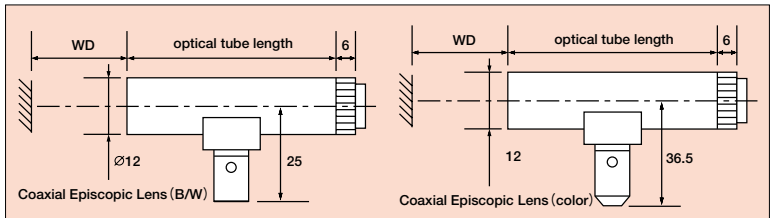
suitable camera　CS4310B, CS4410B, CS8541D, CSCLV90BC3

■High Magnification Lens



model	Magnification	WD（mm）	optics tube length（mm）
NMPL-05LS	0.5×	111	38.1
NMPL-075LS	0.75×	108	68.1
NMPL-1LS	1×	71	56.1
NMPL-2LS	2×	90	56.1
NMPL-3LS	3×	70	68.1
NMPL-4LS	4×	70	86.1
NMPL-5LS	5×	70	94.1

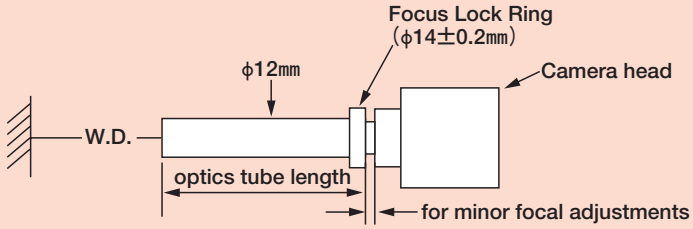
■Coaxial Episcopic Lens



model		Magnification	WD（mm）	optics tube length（mm）
color	B/W			
NMBL-2LSF	**NMBL-2LS**	2×	90	56.1
NMBL-3LSF	**NMBL-3LS**	3×	70	68.1
NMBL-4LSF	**NMBL-4LS**	4×	70	86.1
NMBL-5LSF	**NMBL-5LS**	5×	70	94.1
NMBL-6LSF	**NMBL-6LS**	6×	64	104.1
NMBL-7LSF	**NMBL-7LS**	7×	58	116.1
NMBL-8LSF	**NMBL-8LS**	8×	56	125.1

20m/m Cube camera (M10.5 P0.5 female)Lens (option)

Suitable camera CS4310B, CS4410B, CS8541D, CSCLV90BC3



※Minor focal adjustments are made with void dimensions of less than 1mm.

Model	Field of View (H×V) mm	Magnification	W.D. (mm)	Optics tube length (mm) ±0.3mm
PM6010	48 36	0.1×	325	32.5
PM7010	48 36	0.1×	180	17.0
PM8010	48 36	0.1×	121	13.3
PM6015	32 24	0.15×	223	34.0
PM7015	32 24	0.15×	122	17.5
PM8015	32 24	0.15×	81	13.5
PM6020	24 18	0.2×	173	35.0
PM7020	24 18	0.2×	94	18.0
PM8020	24 18	0.2×	60	14.5
PM6030	16 12	0.3×	122	38.5
PM7030	16 12	0.3×	65	20.0
PM8030	16 12	0.3×	40	15.5
PM6040	12 9	0.4×	96	41.0
PM7040	12 9	0.4×	50	21.5
PM8040	12 9	0.4×	30	16.5
PM6045	10.6 8	0.45×	88	43.0
PM7045	10.6 8	0.45×	46	22.5
PM8045	10.6 8	0.45×	27	17.5
PM6050	9.6 7.2	0.5×	81	44.5

Model	Field of View (H×V) mm	Magnification	W.D. (mm)	Optics tube length (mm) ±0.3mm
PM7050	9.6 7.2	0.5×	42	23.0
PM8050	9.6 7.2	0.5×	25	18.0
PM6060	8 6	0.6×	71	47.0
PM7060	8 6	0.6×	36	25.0
PM8060	8 6	0.6×	20	19.0
PM6072	6.6 5	0.72×	63	50.5
PM7072	6.6 5	0.72×	31	26.5
PM6080	6 4.5	0.8×	59	53.5
PM7080	6 4.5	0.8×	28	28.0
PM6090	5.3 4	0.9×	55	56.0
PM7090	5.3 4	0.9×	26	30.0
PM6100	4.8 3.6	1.0×	51	59.5
PM7100	4.8 3.6	1.0×	24	31.5
PM6006	80 60	0.06×	524	30.5
PM7006	80 60	0.06×	295	16.0
PM8006	80 60	0.06×	202	12.5
PM6007	66.6 50	0.072×	444	31.5
PM7007	66.6 50	0.072×	244	16.5
PM8007	66.6 50	0.072×	169	13.0

＊The field of view is when using a 1/3 size CCD.

■ (long W.D. model)

Model	Field of View (H×V)	Magnification	W.D. (mm)	Optics tube length (mm) ±0.5mm
LPM4030	16 12	0.3×	250	74.5
LPM4040	12 9	0.4×	201	80.0
LPM4045	10.6 8	0.45×	185	83.0
LPM4050	9.6 7.2	0.5×	172	86.0
LPM4060	8 6	0.6×	152	92.0
LPM4072	6.6 5	0.72×	136	99.0
LPM4080	6 4.5	0.8×	128	103.5
LPM4090	5.3 4	0.9×	119	109.5
LPM4100	4.8 3.6	1×	112	115.5
PM5030 N2	16 12	0.3×	147	38.0
PM5040 N2	12 9	0.4×	120	41.0
PM5045 N2	10.6 8	0.45×	111	42.5
PM5050 N2	9.6 7.2	0.5×	102	44.5
PM5060 N2	8 6	0.6×	90	48.0
PM5070 N2	6.6 5	0.72×	81	52.0
PM5080 N2	6 4.5	0.8×	77	54.5
PM5090 N2	5.3 4	0.9×	72	58.0
PM5100 N2	4.8 3.6	1×	68	61.5
PM9100 N	4.8 3.6	1×	98	43.0
PM9200 N	2.4 1.8	2×	82	75.0
PM9300 N	1.6 1.2	3×	78	101.5

＊The field of view is when using a 1/3 size CCD.

■ (short W.D. model)

Model	Field of View (H×V)	Magnification	W.D. (mm)	Optics tube length (mm) ±0.5mm
PM7100N	4.8×3.6	1.0×	44.0	23.5
PM7200N	2.4×1.8	2.0×	37.0	40.0
PM7300N	1.6×1.2	3.0×	33.0	56.5

In addition to the magnifications above, we also support built-to-order manufacturing of 1.2x, 1.5x, 1.8x and 2.4x.

＊The field of view is when using a 1/3 size CCD.

Available Boards

ANALOG

Camera	Maker	Board Model
CS8541D	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	Euresys Inc.	Domino Series
	LinX	GINGA++M2/M4
CS8550Di	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	FAST	FVC05/FV-GP440
	Matrox	MeteorⅡ-MultiChannel
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G/MTPEX-DX-G
	Euresys Inc.	Domino Series
	LinX	GINGA++M2/M4
CS8550Di-50	FAST	FVC05/FV-GP440
CS8550i-01	Edeclinsey System	MUPCap-HA2/HA4
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G/MTPEX-DX-G
	Matrox	Solios-Analog
	Euresys Inc.	Domino Series
	Renesas Northern Japan Semiconductor	VP-AX100/Ax110
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8550i-51	Edeclinsey System	MUPCap-HA2/HA4
	FAST	FVC05/FV-GP440
	Renesas Northern Japan Semiconductor	VP-AX100/Ax110
CS8560D	Asia Electronics	PRS-800
	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	FAST	FVC05/FV-GP440
	Matrox	Solios-Analog/MeteorⅡ-MultiChannel
	Euresys Inc.	Domino Series
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8570D	Asia Electronics	PRS-800
	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	DALSA	PC2-Vision
	FAST	FVC05/FV-GP440
	Matrox	Solios-Analog/MeteorⅡ-MultiChannel
	Euresys Inc.	Domino Series
CS8620i	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	DALSA	PC2-Vision
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G/MTPEX-DX-G
	Matrox	Solios-Analog
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8630i	DALSA	PC2-Vision
	Matrox	Solios-Analog
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS4301B	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G/MTPEX-DX-G
	Matrox	Solios-Analog

CameraLink

Camera	Maker	Board Model
CS6910CL	Aval Data	APX-3312/3313
	Interface	CPZ-530121/-530221/-530421/-530521 LPC-530121/-530221/-530421/-530521 PEX-530121/-530221/-530421/-530521
	Graphin	IPM-8531CL-BE/-B/-M/-F IPM-8580CL-M/-F/IPM-5512
	Soliton Systems	EXpresso Series
	DALSA	X-64 CL ipro/Full /Express
	Matrox	MeteorⅡ-CameraLink/Helios-CameraLink/Odyssey-CameraLink
	Euresys Inc.	Grablink Series
	LinX	GINGA digital CL2
CSB1100CL-10	Aval Data	APX-3312/3313
	Graphin	IPM-8531CL-BE/-B/-M/-F IPM-8580CL-M/-F/IPM-5512
	Cognex	MVS-8600
	Soliton Systems	EXpresso Series
	DALSA	X-64 CL ipro/Full /Express
	Matrox	MeteorⅡ-CameraLink/Solios-CameraLink
	Euresys Inc.	Grablink Series
	LinX	GINGA digital CL2/CL2e/4e
CSB4000CL-10A	Aval Data	APX-3312/3313
	Interface	CPZ-530121/-530221/-530421/-530521 LPC-530121/-530221/-530421/-530521 PEX-530121/-530221/-530421/-530521
	Edeclinsey System	MUCap-HD2
	Graphin	IPM-8531CL-BE/-B/-M/-F IPM-8580CL-M/-F/IPM-5512
	Cognex	MVS-8600
	DALSA	X-64 CL ipro/Full /Express
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	Euresys Inc.	Grablink Series
	LinX	GINGA digital CL2/CL2e/4e

CameraLink

Camera	Maker	Board Model
CSCLV90BC3	Aval Data	APX-3311
	Graphin	IPM-5512-Lite/5514-Lite
	Micro Technica	MTPEX-DL-G
CSCV90BC3	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021/-H531122
	Matrox	Solios-CameraLink
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Cognex	MVS-8600
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Photron	FDM-PCIe CL
	Euresys Inc.	Grablink Series
CSCX30BC3	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021/-H531122 CPZ-530421/-530521 LPC-530421/-530521 PEX-530421/-530521
	Matrox	Solios-CameraLink
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Cognex	MVS-8600
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Photron	FDM-PCIe CL
	Euresys Inc.	Grablink Series
	LinX	GINGA digital CL2/CL2e/4e
CSCS20BC2	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2/CL2e/4e
CSCU15BC18	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021/-H531122
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Matrox	Solios-CameraLink
	FAST	FHC3312
	LinX	GINGA digital CL2/CL2e/4e
CSCU30BC18	Aval Data	APX-3312/3313
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	FAST	FHC3312
	LinX	GINGA digital CL2/CL2e/4e
CSCQS15BC23	Aval Data	APX-3312/3318
	DALSA	X-64 CL ipro
	FAST	FVC06
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2e/4e
CSCU30CC18	Aval Data	APX-3312/3313/3318
	Soliton Systems	EXpresso Series
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	LinX	GINGA digital CL2e/4e
CSCQS15CC23	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021/-H531122
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL)/IPM-5512
	Cognex	MVS-8600
	Photron	FDM-PCIe CL
	Matrox	Solios-CameraLink
	Micro Technica	MTPEX-QL-G/DL-G/FL-G
	LinX	GINGA digital CL2e/4e
CSC12M25BM P19-01B (*1)	Aval Data	APX-3312/3313/3318
	Edeclinsey System	MUCap-HD2
	Graphin	IPM-8531PoCL-BE/IPM-5512 IPM8580-CL
	Cognex	MVS-8600
	DALSA	X-64 Xcelera-CL PX4 Dual
	DITECT	DPX-CLM100
	National Instruments Japan	PCIe-1429
	FAST	FHC3312/3313
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2e/4e
CSC12M25CMP19	Aval Data	APX-3312/3313/3318
	Micro Technica	MTPEX-FL-G
	DALSA	X-64 Xcelera-CL PX4 Dual

*1 Some functions are not available

Memo

Glossary①

1. 1394IIDC
The IEEE 1394 standard covers physical and data link layers. Producing products that conform to IEEE 1394 also requires incorporating communication control protocols and device-specific control command sets at higher layers. Command sets to control camera functions and image data transfers using IEEE 1394 for cameras connected to PCs are defined in a IIDC1394-based digital camera specification reviewed and standardized by the Camera Sub WG (sub-working group in the Instrumentation & Industrial Control Working Group) of 1394TA (Trade Association).

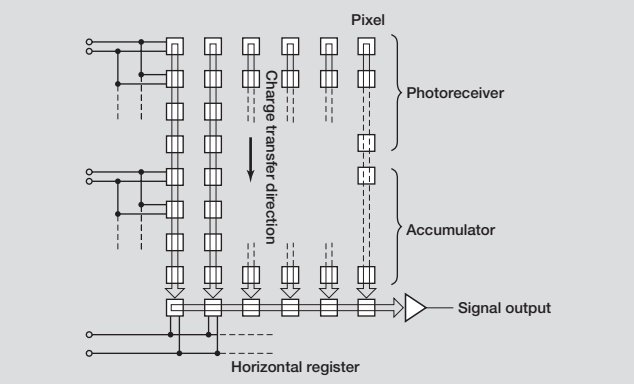
2. AGC circuit
Automatic Gain Control circuit. Controls gain automatically to maintain constant output signal levels.

3. ALC (ELC) function
Function to automatically vary the speed of the electronic shutter based on subject brightness to maintain constant output signals. This function is ideal for various applications - for example, when varying the magnification on TV-monitor microscopes. It can also be used in lieu of aperture adjustments with fixed-aperture lenses or optical systems that lack aperture control, like endoscopes.

4. Camera Link
Camera Link, an interface standard for communication between a camera and frame grabber board, has been reviewed and standardized by the AIA (Automatic Imaging Association) with the goal of standardizing previously non-standardized interfaces for cameras and grabber boards.

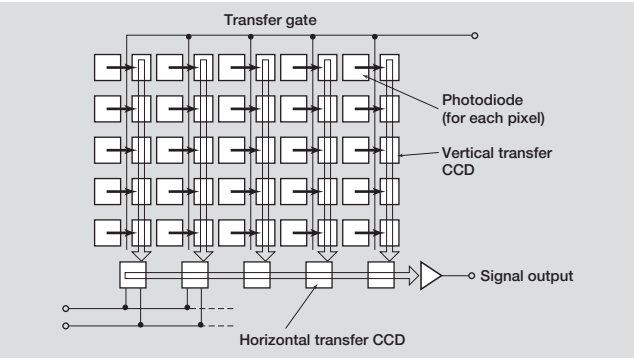
5. CCD solid-state image sensor
● Frame transfer CCD

A CCD that transfers signal charges photoelectrically converted at the photoreceiver to the accumulator during vertical flyback time and then scans in sequence for each line using a horizontal transfer CCD.

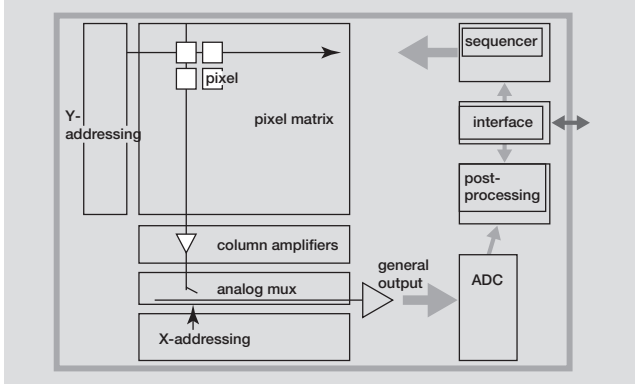


● Interline transfer CCD

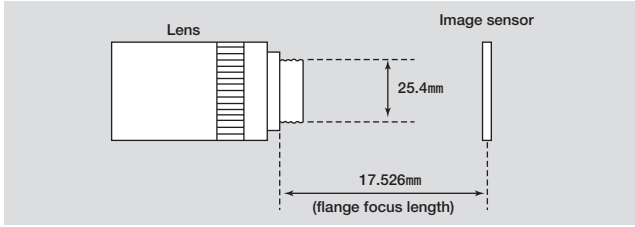
A CCD that transfers the signal charges photoelectrically converted at the photoreceiver en masse to the vertical register before transferring vertically, transferring horizontally, and scanning each line from the CCD.



6. CMOS image sensor
CMOS is an abbreviation for "complementary metal oxide semiconductor," a widely-used semiconductor for LSIs and memory. A CMOS image sensor outputs images by scanning the photodiode and amplifier for each pixel. The main advantages are low current consumption and random scanning capacity.



7. C mount
A standard mount mechanism used to mount 16 mm imaging lenses, as shown in the figure below.



8. DCF
An abbreviation for "design rule for camera file system," this is the standardized format for digital camera recording. It comprehensively stipulates the folder configuration and folder/file naming rules for storing images on memory cards to improve compatibility between different DCF-compliant devices.

9. DG/DP
DG (differential gain) and DP (differential phase) indicate the extent of effects on the amplitude characteristics (gain) and phase signals of the sum of reference signals in image signals when compared with the original state.
DG is expressed in "%," while DP is expressed in "° ."

10. EIA-644
Refers to the RS-644 standard stipulated by the EIA for reduced voltage, reduced EMI, and high-speed data transfers.

11. EIA dimensions (size)
The EU/US 19-inch rack standard for racks and unit chassis. The width of a single standard chassis is 482.6 mm (19 inches), while heights are multiples of 44.45 mm (= 1U). The Japanese JIS industrial standard specifies a chassis unit width of 480 mm and height in multiples of 50 mm (= 1J).

12. Gigabit Ethernet
The Ethernet connection format is specified by IEEE802.3u. Normally consisting of four pairs of unshielded twisted pair cables connected using RJ-45 connectors, this standard is compatible with the 10/100BASE-T format used in PC LAN networks. Supports data transfer rates of up to 1 Gbps. The main advantages of Gigabit Ethernet for FA cameras include the elimination of the need for dedicated data importing interface boards and the ability to use cables up to 100 m long.

Glossary ②

13. IEEE 1394
Standard for high-speed serial interfaces permitting transfer speeds of 100 Mbps or more. Transfer speeds are defined as 100 Mbps, 200 Mbps, and 400 Mbps, with standards also provided for speeds of 800 Mbps, 1.6 Gbps, and 3.2 Gbps or higher. IEEE 1394.a allows transfer speeds of up to 400 Mbps; IEEE 1394.b allows transfer speeds exceeding 800 Mbps. Allows up to 63 devices to be connected, with a maximum distance of 4.5 m between devices. Power can be supplied via the bus.

14. LVDS
An abbreviation for "low-voltage differential signaling," a small-amplitude interface characterized by small signal amplitude balanced transmission.

15. OSD
An abbreviation for "on-screen display," in which multiple setting menus are displayed on screen.

16. RoHS Directive
RoHS is an abbreviation for "Restriction of Hazardous Substances," a directive implemented by the EU in February 2003 to restrict the use of specified hazardous substances in electronic and electrical devices.

17. SN ratio
The ratio of a TV camera output signal to the noise component found within the signal. It is expressed as the ratio in decibels of the rated signal output to the output when light is shielded.

18. USB
An abbreviation for "universal serial bus," this standard for PC serial interfaces was jointly announced by seven companies, including Intel and Microsoft. Data transfer speeds are 12 Mbps for full-speed mode and 1.5 Mbps for low-speed mode. (USB 2.0 permits transfer rates of up to 480 Mbps.)

19. VS/VBS
VS is a B/W video signal combining video and synchronizing signals. VBS is a color composite video signal with a color burst signal superimposed on the VS.

20. WOI (Window of Interest) function
Scanning speeds for CMOS cameras can be increased by scanning only those areas specified by the user. Partial scanning with CCD cameras lets users set partial scanning limits only along a vertical axis; the WOI function allows scanning of areas specified in terms of both vertical and horizontal edges.

21. Aspect ratio
The ratio of the vertical and horizontal size of a display screen. NTSC systems use a ratio of 4:3. A ratio of 1:1 is used for medical applications, including X-ray systems.

22. Dark current
Dark current is a signal current present when all light to a lens is blocked; it increases with ambient temperature. Lower values are preferred for image processing applications.

23. Color temperature
The red/yellow/blue radiant energy distribution varies depending on ideal blackbody temperature. This temperature is expressed in K (Kelvin). Color temperature correction filtering or electrical color temperature correction is used, since differences in color temperature for color TV cameras can prevent accurate reproduction of color.

24. Interlacing
Also called interlaced scanning; images on TV monitors are created by scanning alternate lines, creating the completed image with the second scan.

25. Image band frequency
The frequency characteristics of an image signal, normally expressed as an output signal level for a constant sine wave input and the curve corresponding to the phase frequency.

26. Overscan/underscan
Overscan refers to the case in which the ringing and peripheral distortion immediately after blanking is eliminated for approximately 10% of the camera image on TV monitors, while underscan referring to cases in which the entire effective field of view of the camera image is visible. TV monitors are generally adjusted to overscan.

27. Resolution
An indication of the ultimate detail with which a subject can be reproduced, resolution is generally measured by the number of black and white lines that can be reproduced per unit of screen height and width. Horizontal resolution describes the horizontal value, while vertical resolution describes the vertical value. If 500 white and black lines can be produced, the resolution is 500.

28. External synchronization
Used to synchronize scan timing when using multiple cameras simultaneously. This may include VBS, VS, or HD/VD. VBS also synchronizes the burst (color) signal. VS synchronizes vertical and horizontal scanning. HD and VD, respectively, synchronize vertical and horizontal scanning. External synchronization is also referred to as genlock (generator lock).

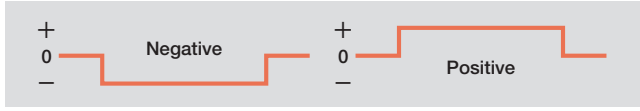
29. Pixel count (graphic) designations and units
Toshiba Teli defines computer pixel counts as follows:

Designation	Horizontal (H) × vertical (V) dots lines	Standard image band frequency (MHz)	Horizontal/vertical scanning (frequency (kHz/Hz)
VGA	640×480	Approx. 25.176 and above	31.5/59.94
SVGA	800×600	Approx. 36 and above	35.2/56.2
XGA	1024×768	Approx. 65 and above	48/60
SXGA	1280×1024	107～135	64～78/60～72
UXGA	1600×1280	150MHz and above	100/90

30. Color bar
A color standard signal used to adjust the color of color monitors. This may take the form of a color bar signal generated electrically by a color bar generator circuit or a color bar chart used for camera adjustments. A color bar consists of seven colors - white, yellow, cyan, green, magenta, red, and blue - counting from left to right.

31. Gamma (γ) characteristics
For TV cameras, this refers to the signal output for incident light; for monitors, this is the relationship between image brightness and input signals. Linear characteristics ($\gamma = 1$) are preferred for TV systems.

32. Polarity
Indicates the type of synchronizing signal, as shown below.
Negative polarity/Positive polarity



33. Cross color
Interference between pixels occurring when brightness signals leak into the color signal, resulting in color at points where there should be no color.

Glossary ③

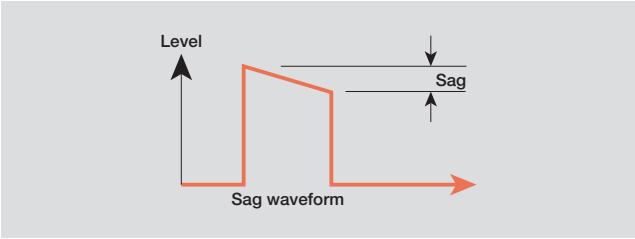
34. Crosstalk
Refers to signal leakage between circuits for a reference channel and adjacent channels when the same circuits are used for multiple channels. Crosstalk is normally quantified in decibels (dB).

35. Global shutter function
An electronic shutter system in CMOS image sensors which enables exposure of all pixels simultaneously, as with CCDs. The electronic shutter systems used with earlier CMOS image sensors are called rolling or focal-plane shutters; these shutters typically produce anomalous images with moving subjects unless a mechanical shutter is used, since different pixels are exposed for each line at slightly difference times.

36. Composite synchronization signal
Combines vertical and horizontal synchronizing signals into a single system. Systems with separate vertical and horizontal synchronizing signals are called separate sync systems.

37. Minimum luminance
Refers to the maximum sensitivity of a TV camera under practical conditions. If luminance drops below this level, noise tends to increase significantly, and problems arise with contrast detection.

38. Sag
Refers to the phenomenon in which synchronization signal levels rise or fall during startup, etc.



39. Shading noise
Refers to the distortion between highlights and shadows caused by variations in imaging sensitivity, subject brightness, light transmittance through the lens, and CRT illumination. Shading noise is normally expressed as the degree of signal nonuniformity when the imaging unit is subjected to uniform illumination.

$$\text{Shading noise} = \frac{\text{Signal maximum} - \text{Signal minimum}}{(\text{Signal maximum} + \text{Signal minimum}) / 2} \times 100(\%)$$

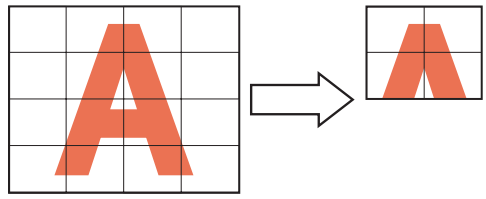
40. Shading noise correction
A sawtooth or parabolic waveform synchronized to the vertical and horizontal frequencies is normally added to the image signal to correct shading on-screen.

41. Depth of field
Refers to the range of distances over which the subject remains in focus. Depth of field increases as the camera is moved farther from the subject with short focal length lenses or stopped-down lenses.

42. Superimposing
Refers to the superimposing of one signal onto another.

43. Image distortion
Expresses the difference between the subject and the image displayed on the screen as a ratio of screen vertical dimensions.

44. Scalable
Allows scanning of the screen in units of 1/16th of the screen area. Only adjacent units of rectangular forms can be selected; units of irregular shapes are not permitted. In scalable mode, the camera scans only the specified sections at standard speed, rapidly skipping over other sections, reducing the trigger interval when vertical clipping widths are small. Note that trigger intervals cannot be reduced along the horizontal axis due to the CCD sensor operation mechanism, even when clipping width is reduced.



45. Smearing
Refers to bright banding that appears on screen in the presence of bright points of light in an imaging area. This phenomenon can cause vertical banding due to excessive charge build-up, particularly in TV cameras incorporating solid-state imaging sensors.

46. Square grid array (CCD)
Individual CCD pixels have equal vertical and horizontal dimensions, eliminating the need for correction processing in image processing. Square grids are also known as square pixels.

47. Single panel 3-layer CMOS device
Special sensors capable of producing sharp, moiré free images without color filtering due to a three-layer photo-detector configuration that makes it possible to output RGB signals from each pixel.

48. TV format
● NTSC format
Standard color TV format used in countries such as Japan and the USA, with an aspect ratio of 4:3, horizontal scanning frequency of 15.734 kHz, and vertical scanning frequency of 59.94 Hz. This format is notable for its capacity to transmit color signals at a B/W TV format band frequency (6 MHz). Other color formats include PAL and SECAM.
● EIA format
Standard B/W TV camera format, with an aspect ratio of 4:3, horizontal scanning frequency of 15.75 kHz, and vertical scanning frequency of 60 Hz.
● CCIR format
Standard B/W TV camera format used in Europe, with an aspect ratio of 4:3, horizontal scanning frequency of 15.625 kHz, and vertical scanning frequency of 50 Hz.
● RGB format
Format in which the three primary color (red, green, blue) video signals are output together with a synchronizing signal. Compared to NTSC format, this produces high-resolution images with outstanding color reproduction and no cross color.

49. Electronic shutter
Used to produce blur-free images of moving subjects by reducing CCD accumulation times and to adjust sensitivity (e.g., for the ALC function).

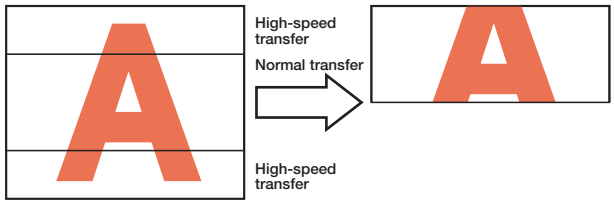
50. Electronic line/reticule marks
All Toshiba Teli cameras with product codes ending in L (e.g. CS3330BLi) and the LG510 peripheral electronic line generator are able to display electronic lines or reticules on monitors by superimposing them on the video signal. Up to two vertical and two horizontal electronic lines can be moved using the front panel knobs or switches. The lines can be switched between

negative and positive, and gain (brightness) can also be adjusted to suit the subject.
The LG510 uses digital electronic lines, which are more stable than analog lines when switching power on and off and more resistant to variations over time. We recommend using these for subject positioning.

51. Dot clock
Refers to the display time per dot (pixel) converted to frequency.

52. Non-interlacing (Progressive scanning)
Interlaced scanning scans alternate lines; this system scans sequentially.

53. Partial scanning
Refers to scanning partial areas vertically, such as the middle half; enables images to be output faster than conventional scanning. Programmable partial scanning also allows specification of areas using external pulses.



54. Standard subject luminance
Refers to the luminance required to ensure optimal performance of TV cameras.

55. Field/frame
A single scan from the top to the bottom of the screen is called the field. With interlaced scanning, a screen formed of two fields is called a frame.

56. Flange back
Refers to the distance from the lens flange surface to the imaging plane in the imaging unit.

57. Flicker
Refers to the phenomenon of flickering light and dark screens when imaging under fluorescent lighting.

58. Prismatic resolution optical system
The short optical path enables simple, efficient, compact designs but requires special lenses and long flange focus length.

59. Blooming
Refers to a phenomenon in which intense light entering the imaging unit appears to spread to surrounding areas.

60. Full frame
Refers to the ability to output all data for a frame when using a random trigger shutter. Conventional systems generally enabled the capture of only data for a field (at half the nominal vertical resolution).

61. Frame rate
Refers to the number of frames captured per second.
EIA format cameras are capable of 30 frames per second. High-speed cameras achieve 60 fps, and high-resolution cameras 12 fps.

62. Spectral sensitivity characteristics
Imaging units may exhibit differences in sensitivity to different colors (wavelengths) and to intensity.

63. White clip
Image contrast may become blurred, making the image hard to view when the TV screen includes intense spot lights. This is resolved using a white clip circuit to compress video signals with levels exceeding a preset value.

64. White balance
Refers to the color balance for devices such as color TV cameras and color monitors. Adjusting the image so that white objects appear white is called white balance adjustment.

65. Multiple shutter
Outputs images exposed using the external trigger signal according to the scanning signal with functions applying a random trigger shutter. Overlapping exposures are possible until the scanning signal is input, enabling strobe-like imaging with moving subjects if the trigger signal is input continuously during imaging. This can also be effective, when using multiple cameras, for inputting simultaneously-exposed images to a processing system by shifting the timing.

66. Multi slope (Dual slope)
Achieves a wide dynamic range by compressing contrast on the CMOS sensor itself. This parameter can be manually set by the user, or a pre-set parameter can be selected from an external device.

67. Moiré
Refers to the phenomenon in which fringes appear on the screen when imaging subjects with a fine grid pattern.

68. Real-time display
Toshiba Teli information devices, ranging from Telinet to visual controllers and LCD displays, produce real-time video images from the image data input.

69. Restart reset
Images can be obtained at the desired timing according to the restart reset pulse input (VD input) for continuous HD input. This can be used to obtain high sensitivity with long accumulation times, since images are easily produced at low shutter speeds.

PIN Assignment

Standard pin assignment for individual camera DC IN connectors.
Please see user guide for details.

■FireDragon series

IEEE1394 Connector
HSR-BV011 (COMOSS)

TRIG IN Connector
Camera:HR10A-7R-4PB (73) (HIROSE)
Cable:HR10A-7P-4S (73) (HIROSE)

pin No.	assignment	I/O	pin No.	assignment	I/O
1	TPB (−)	I/O	1	TRIG IN	I
2	TPB (+)	I/O	2	GND	—
3	TPA (−)	I/O	3	N.C.	—
4	TPA (+)	I/O	4	N.C.	—
5	TPA (R)	—			
6	VG	—			
7	SC	—			
8	VP	I			
9	TPB (R)	—			

■GiantDragon series

Gigabit Ethernet Connector
Camera:P65-P01-19V8 (ST)

TRIG IN Connector
(Camera) HR10A-7R-6PB (73) (HIROSE)
(Cable) HR10A-7P-6S (73) (HIROSE)

pin No.	I/O	assignment	pin No.	assignment
1	I/O	BI_DA+	1	BUSY_OUT
2	I/O	BI_DA−	2	GND
3	I/O	BI_DB+	3	GND
4	I/O	BI_DC+	4	TRIG_IN
5	I/O	BI_DC−	5	EXPOSE_OUT
6	I/O	BI_DB−	6	+12V
7	I/O	BI_DD+		
8	I/O	BI_DD−		

■Clever Dragon CSC12M25BMP19-01B/ CSC12M25CMP

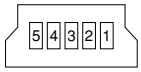
DC IN/SYNC Camera Connector:HR10A-10R-12PB (HIROSE)
Cable Connector:HR10A-10P-12S (HIROSE)

pin No.	I/O	assignment
1	—	GND
2	I	+12V
3	—	GND
4	—	N.C.
5	—	GND
6	I	N.C.
7	I	N.C.
8	—	GND
9	—	N.C.
10	—	N.C.
11	—	TRIG
12	—	GND

■CSDS60CM3/CSDW2M60CM28

Mini-USB camera : UX60SC-MB-5ST (80) (HIROSE)

pin No.	assignment	I/O
1	POWER	—
2	USB D−	I/O
3	USB D+	I/O
4	N.C.	—
5	USB_GND	—



■CS6910CL

Camera Connector : HR10A-10R-12PB (HIROSE)
Cable Connector : HR10A-10R-12S (HIROSE)

pin No.	assignment
1	GND
2	+12V IN
3	GND
4	VBS OUT
5	GND
6	HD OUT
7	VD OUT
8	N.C.
9	N.C.
10	WEN OUT
11	TRG IN
12	GND

■CS6940CL/CS5851QCL

DC IN/SYNC Camera Connector:HR10A-12PB (HIROSE)
Cable Connector:HR10A-10P-12S (HIROSE)

pin No.	assignment
1	GND
2	+12V
3	N.C.
4	N.C.
5	GND
6	N.C.
7	N.C.
8	GND
9	N.C.
10	N.C./WEN (CS6940CL)
11	TRIG
12	GND

■CS5270B/CS5260BD/BDP

Connector HR10A-10P-12S (HIROSE)

pin No.	CS5270B	CS5260BD
	assignment	
1	GND	
2	+12V	
3	GND	
4	VIDEO OUT	
5	GND	
6	SI (for adjustment) ※	
7	PC (for adjustment) ※	—
8	C.OUT	
9	SO (for adjustment) ※	
10	Y.OUT	
11	+12V	
12	GND	

※Use in open state for adjustment signals.

■CSB1100CL-10

Connector HR10A-7P-6S (HIROSE)

pin No.	assignment
1	N.C.
2	N.C.
3	GND
4	N.C.
5	N.C.
6	+12V

■CSB4000CL-10A

Connector HR10A-10P-12S (HIROSE)

pin No.	assignment
1	GND
2	+12V
3	GND
4	N.C.
5	GND
6	N.C.
7	N.C.
8	GND
9	N.C.
10	N.C.
11	N.C.
12	GND

■CS8581QF

IEEE1394 Connector
HSR-BV011 (COMOSS)

TRIG IN Connector
D02-M15SAG-13L9 (JAE)

pin No.	assignment	I/O	pin No.	assignment	I/O
1	TPB (−)	I/O	1~11	N.C.	—
2	TPB (+)	I/O	12	TRIG IN	I
3	TPA (−)	I/O	13	TRIG GND	—
4	TPA (+)	I/O	14	N.C.	—
5	TPA (R)	I/O	15	N.C.	—
6	VG	I			
7	SC (NC)	—			
8	VP	I			
9	TPB (GND)	I/O			

■CS3821D

Connector　HR10A-10P-12S (HIROSE)

pin No.	assignment
1	GND
2	+12V
3	VIDEO GND
4	VIDEO OUT
5	HD　GND
6	HD　IN
7	VD　IN
8	TRIG　GND
9	TRIG IN (PARTIAL IN) ※
10	WEN　OUT
11	TRIG　IN
12	VD　GND

※When using the optional partial scan mode feature, pin 9 dedicated to external partial signal input.

■CS8541D

Connector　D02-M15SAG-13L9

pin No.	assignment
1	GND
2	+12V
3	VIDEO　GND
4	VIDEO　OUT
5	GND
6	HD　GND
7	HD　IN
8	VD　IN
9	VD　GND
10	GND
11	N.C. (PARTIAL　IN) ※
12	TRIG　IN
13	TRIG　GND
14	WEN　OUT
15	GND

※When using the optional program partial scan mode feature, pin 11 dedicated to external partial signal input.

■CS8560D/CS8570D/CS8550Di/-50/CS8550i-01/-51

Connector　HR10A-10P-12S (HIROSE)

pin No.	CS8560D/CS8570D	CS8550Di/-50	CS8550i-01/-51
	assignment		
1	GND		
2	+12V		
3	VIDEO　GND		
4	VIDEO　OUT		
5	HD　GND		
6	HD　IN		
7	VD　IN		
8	TRIG　GND		
9	N.C.		TRIG　IN
10	WEN　OUT		GND
11	TRIG　IN		+12V
12	VD　GND		

■CS8310Bi/BCi/CS8311Bi/BCi

Connector　HR10A-10P-12S (HIROSE)

pin No.	external synchronization			internal synchronization
	HD・VD	VS/SYNC	restart/reset	
1	GND			
2	+12V			
3	VIDEO　GND			
4	VIDEO　OUT			
5	HD　GND	—	HD　GND	HD　GND　※1
6	HD　IN	—	HD　IN	HD　OUT　※1
7	VD　IN	VS/SYNC　IN	RESET TRIG IN	VD　OUT　※1
8	TRIG/CLK GND※2	CLK GND　※2	TRIG/CLK GND　※2	
9	TRIG IN/CLK OUT※2	CLK OUT　※2	TRIG/CLK OUT　※2	
10	GND			
11	+12V			
12	VD　GND	VS/SYNC　GND	RESET TRIG GND	VD　GND　※1

※1 HD and VD output is enabled through a switch inside the camera for internal synchronous operation.
※2 Clock output is enabled through a switch inside the camera. Clock output is not available when inputting shutter trigger (when using a special shutter)

■CS8400 Series

Connector　HR10A-10P-12S (HIROSE)

pin No.	external synchronization		internal synchronization
	HD・VD	VS/SYNC	
1	GND		
2	+12V		
3	VIDEO　GND		
4	VIDEO　OUT		
5	HD　GND	—	HD　GND　※
6	HD　IN	—	HD　OUT　※
7	VD　IN	VS/SYNC　IN	VD　OUT　※
8	N.C.		
9	N.C.		
10	GND		
11	+12V		
12	VD　GND	VS/SYNC　GND	VD　GND　※

※HD and VD output is enabled through a switch inside the camera for internal synchronous operation.

■CS8600 series/CS4000B series

Connector　HR10A-10P-12S (HIROSE)

pin No.	external synchronization			internal synchronization
	HD・VD	VS/SYNC	restart/reset	
1	GND			
2	+12V			
3	GND			
4	VIDEO　OUT			
5	GND			
6	HD　IN	N.C.	HD　IN	HD　OUT※
7	VD　IN	VS/SYNC　IN	R.R　IN	VD　OUT※
8	GND			
9	CLK　OUT			
10	WEN　OUT		N.C.	WEN　OUT
11	TRIG　IN			
12	GND			

※HD and VD output is enabled through a switch on the back panel of the cameara for internal synchronous operation.

HIROSE: Hirose Electric Co. Ltd.
HTK: Honda Tsushin Kogyo Co. Ltd.
COMOSS: Comoss Co. Ltd.
JAE: Japan Ariation Electronics Industry Co. Ltd.
ST: Speed Tech Co. Ltd.

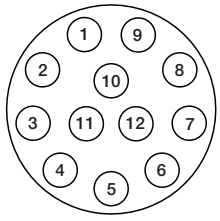
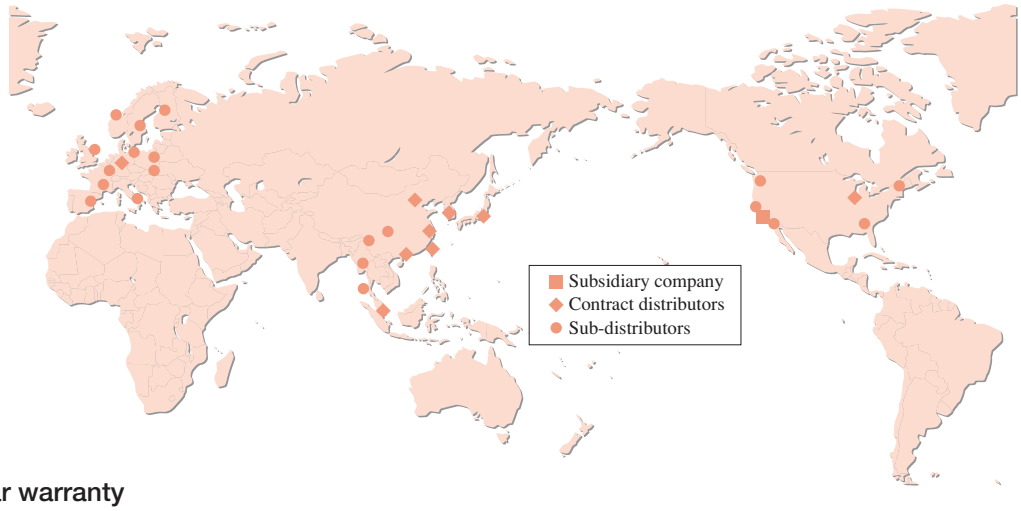


Diagram of receptacle as seen from connection side (back of camera/CCU)

Product Assurance and Service System

Toshiba Teli products are subject to a total in-house production system from the procurement and supply of components to assembly, wiring, and inspection.
Reliability and quality are assured through a quality control traceability system complying with national standards.



One-year warranty

All products will be repaired free of charge for any defects attributable to Toshiba Teli arising within one year of delivery.

After-sales service

Customers demand comprehensive and fast service operations. Toshiba Teli offers prompt after-sales service centering on Tokyo and Osaka.
In the event that a fault occurs in a product, please contact the nearest sales office or distributor.
We will act appropriately and promptly. The service data obtained will be analyzed and used to implement improvements to prevent future failures on the user end.

Demonstrations

A range of demonstration products is available for customers who wish to try out the products or want to learn more about them. Please feel free to utilize these.

Catalogs and literature requests

Customers wanting more detailed technical information than that provided in demonstrations or product catalogs should contact the nearest sales office.

Headquarters

Showroom

Please read the following disclaimers before using Toshiba Teli products.

Disclaimers

- Toshiba Teli accepts no responsibility for losses arising from fire, earthquake, other accidents attributable to external causes or attributable to negligence or errors on the part of the user, improper use or use under abnormal circumstances.
- Toshiba Teli accepts no responsibility for incidental losses (including business losses or losses from business suspension) arising from use or non-use of these products.
- Toshiba Teli accepts no responsibility for losses arising from use other than as described in the corresponding instruction manuals (including hot-swapping or turning off power while saving data).
- Toshiba Teli accepts no responsibility for losses arising from malfunctions attributable to use in combination with other devices.
- Toshiba Teli accepts no responsibility for losses arising due to repairs or modifications performed by the customer or final user.

●The information in this catalog is current as of August 2012. ●The information in this catalog is subject to change without notice.

Environmental preservation activities

ISO 14001
BUREAU VERITAS
Certification

Toshiba teli Corporation's head office has been achieved certification under the international environment management system standard ISO14001 program.

ISO14001

At Toshiba teli, we believe it is our responsibility to pass on our irreplaceable global environment to the next generation in a healthy condition. Therefore, we participate in environmental preservation activities. To reduce the burden on our earth environment throughout the product lifecycle, we pursue the development of environmentally conscious products (ECP) through technologies such as lead-free manufacturing and energy conservation.

- Development of environmentally conscious products
- Promotion of "green" procurement
- Reduction of and safe handling of harmful chemicals
- Reduction in scrap, promotion of recycling
- Promotion of energy conservation, centered on control of power consumption

Quality control system

ISO 9001
BUREAU VERITAS
Certification

Toshiba teli Corporation has approved international quality assurance standard ISO9001.

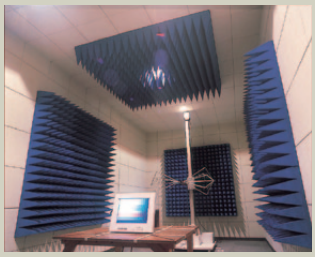
ISO9001

Certificated items:
Video camera, display and other equipment.
Medical and Industrial RF amplifie

Teli achieved certification under the ISO9001 international quality management system in 1994. We pursue efforts to improve quality in order to produce products our customers all over the world can use with confidence.

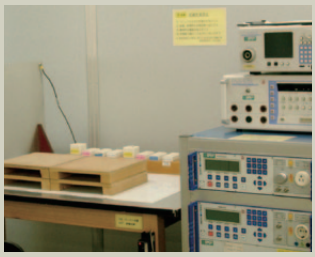
Quality policies

We will contribute to the progress of society and provide higher levels of satisfaction for our customers by continually making quality our top focus and through continuous improvement activities.



RF anechoic chamber

We use our RF anechoic chamber to test our imaging and information products to verify that they do not emit extraneous electromagnetic radiation (radiated emission) and that they are not malfunction when subjected to electromagnetic radiation from other devices (immunity to electromagnetic interference), and to verify that they meet international standards in these areas.



Shielded room

We use our shielded room to test our products for immunity to static electricity, power surges, and power supply line noise. We make sure that all our devices designed for the international market meet the required standards of each country, and certify our devices for the European market with the CE marking, in accordance with the EU Electromagnetic Compatibility (EMC) directive.

Temperature chamber

We perform environmental testing on our products, testing their operating temperature and storage temperature ranges. To enhance product safety, we also test abnormal conditions and test with stand voltages and leakage after the products have been subjected to worst-case high temperature and high humidity conditions.

Vibration and shock testing lab

We perform safety and reliability testing on our products appropriate to the market for which they are designed, whether the products are targeted at a factory environment, medical environment, or research and development environment. As appropriate, we obtain the necessary certifications for our products, including TUV-S for the domestic market, TUV-GS for the international market, TUV-GM for medical equipment, and UL and ETL for the U.S.

TOSHIBA TELI CORPORATION
URL : http://www.toshiba-teli.co.jp

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